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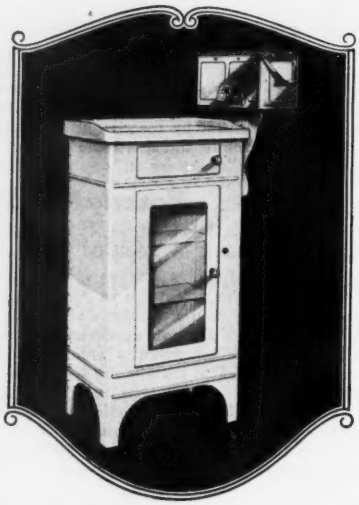

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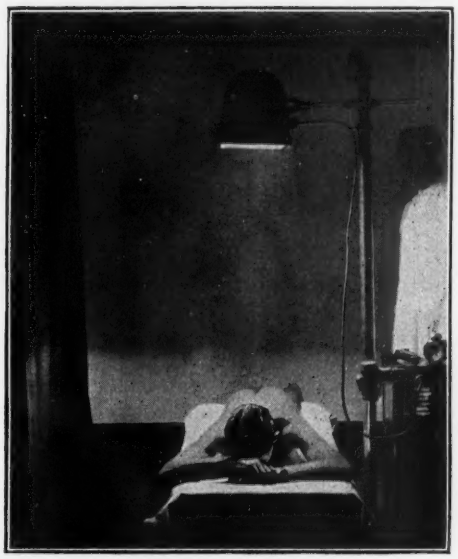

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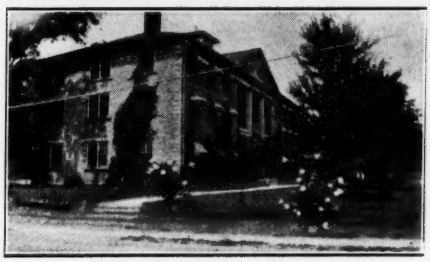

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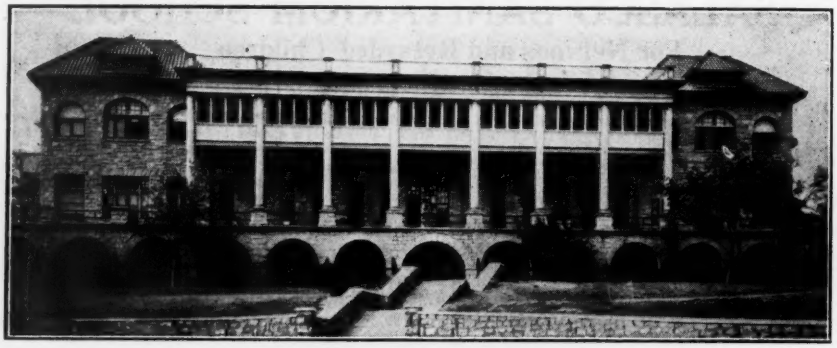

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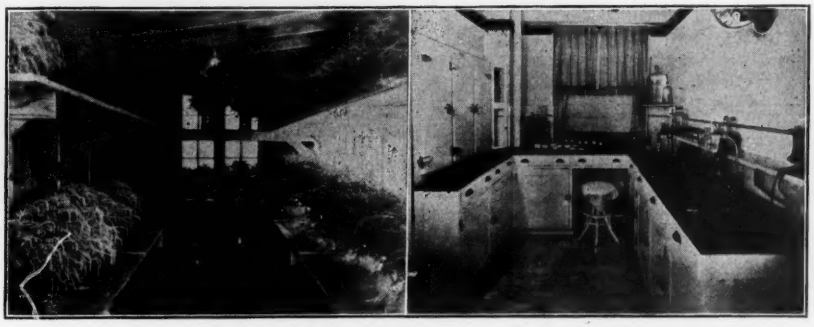

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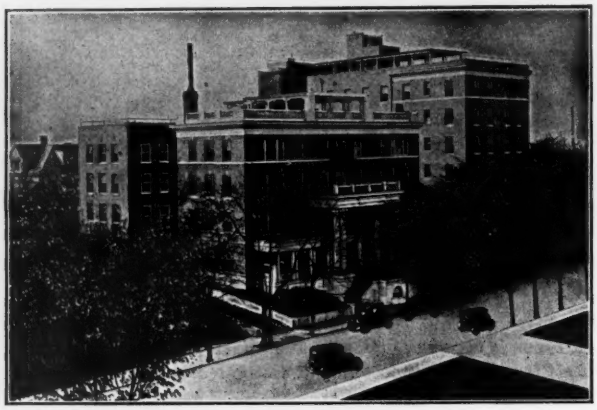

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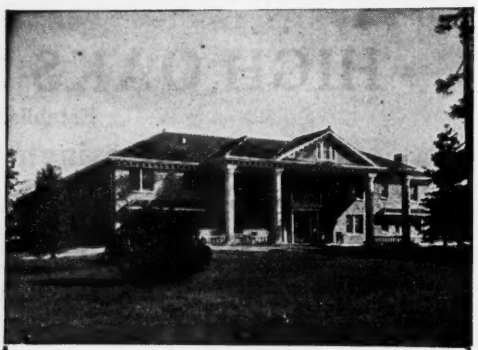

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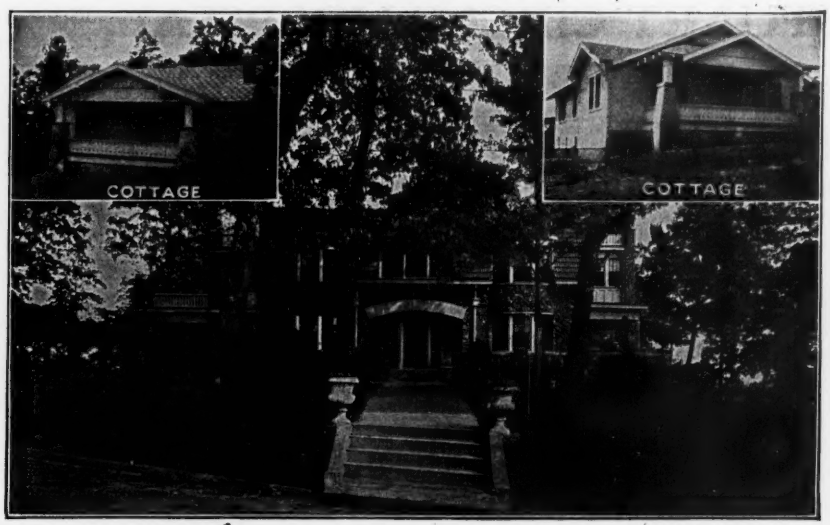

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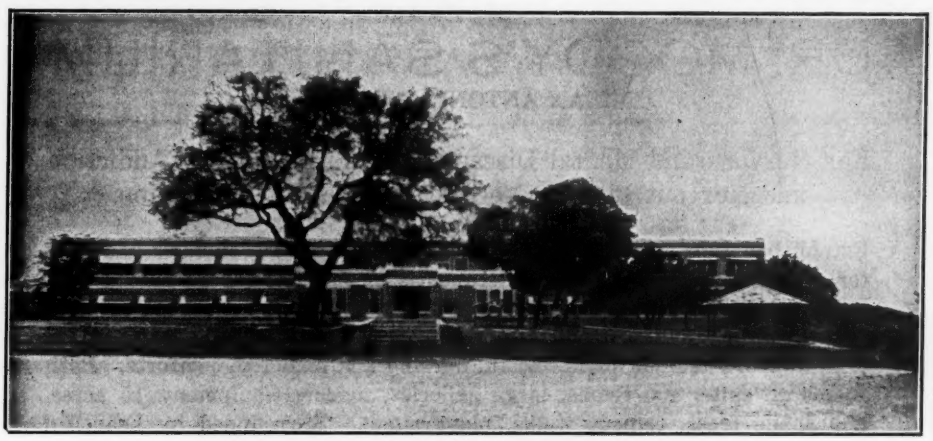

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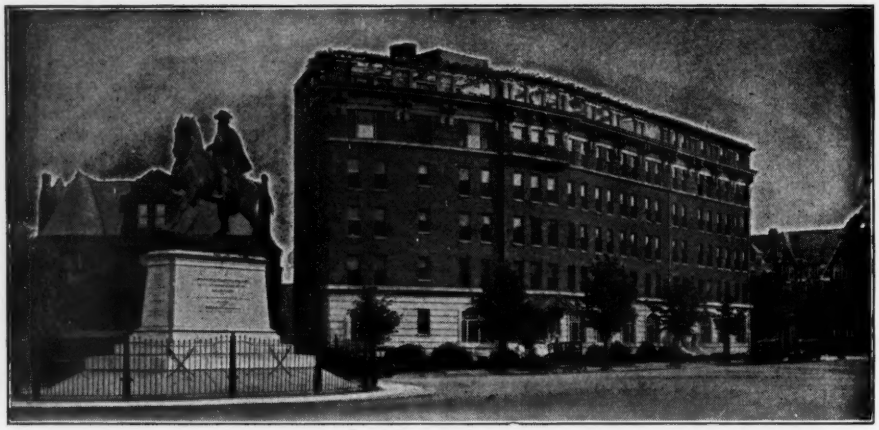

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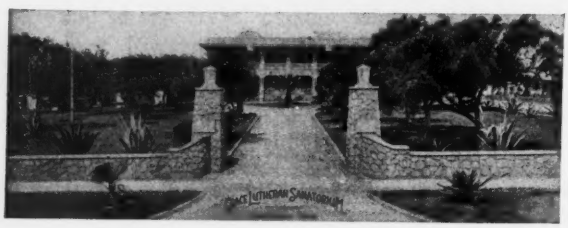

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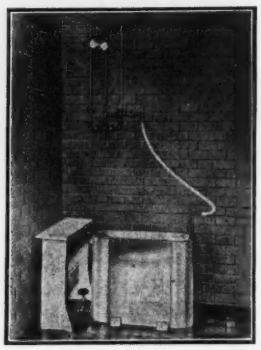

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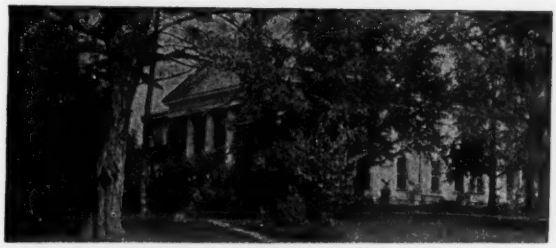

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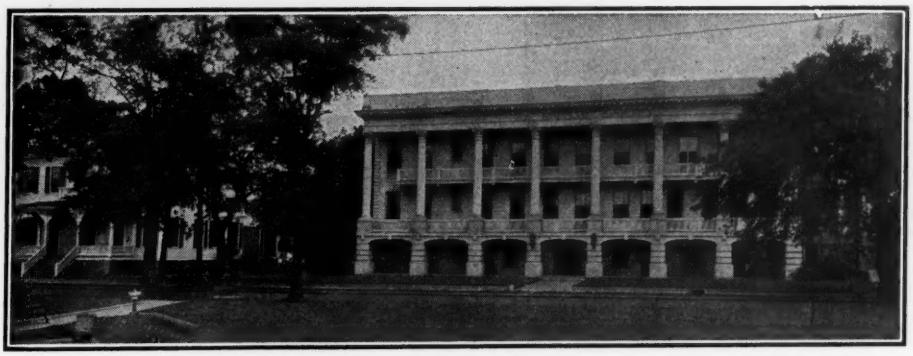

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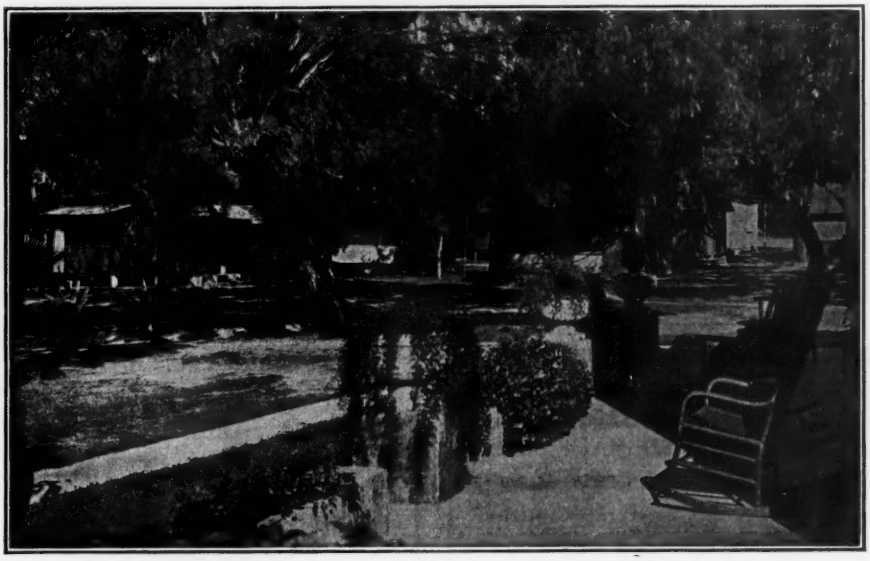

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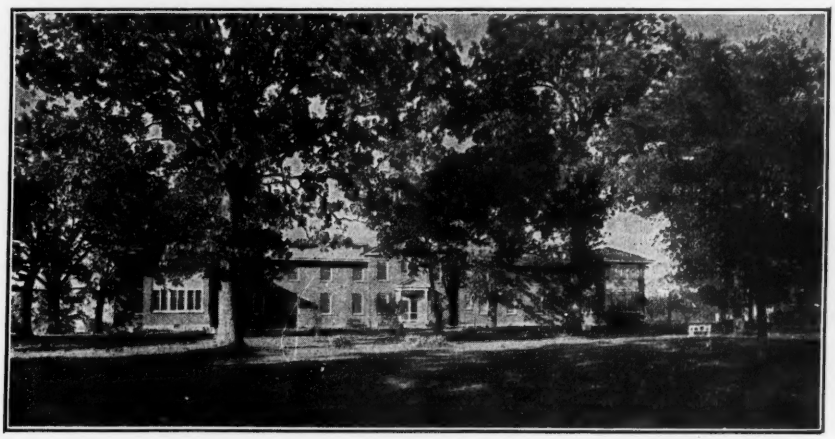

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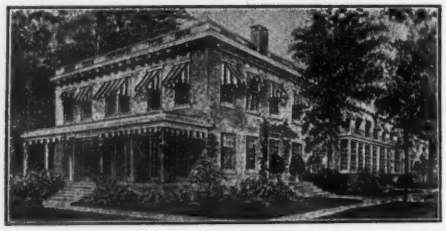

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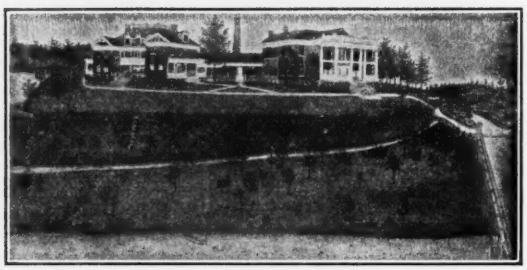

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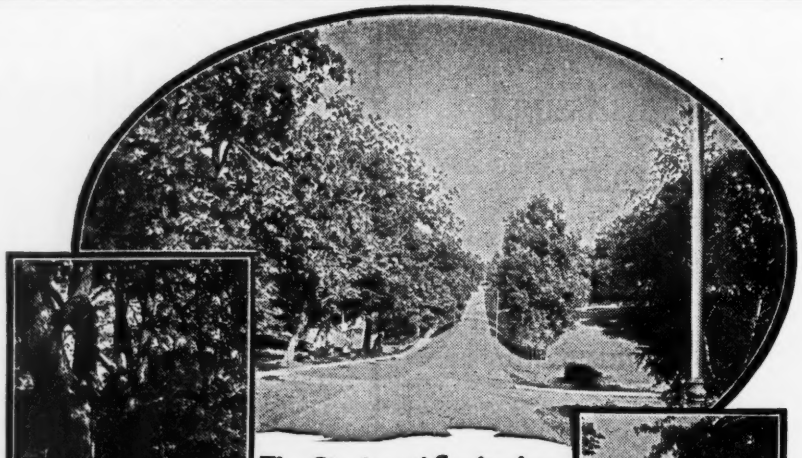

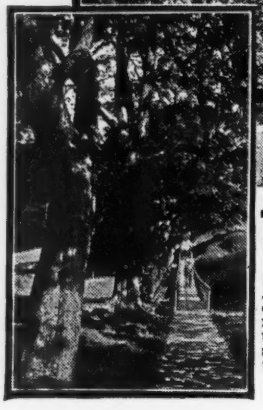

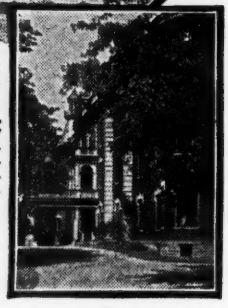

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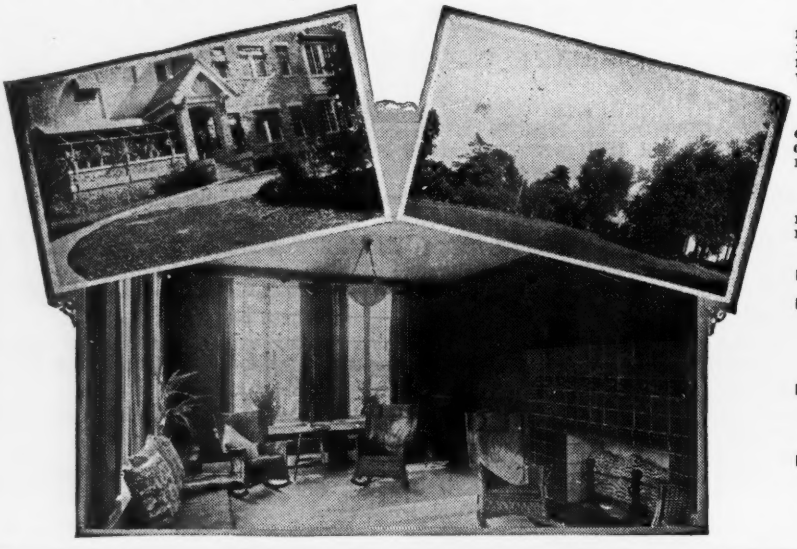

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LIBERALIZING THE CURRICULUM*

By WILBURT C. DAVISON, M.D.,
Duke University,
Durham, N. C.

Most of the ills of medical education are attributed to the curriculum. Although the correctness of the diagnosis cannot be proven, numerous therapeutic experiments are being made with the schedules of various medical schools.[1] It is generally agreed that the common goal is to give a student as firm an understanding as possible of the major subjects of medicine, namely: anatomy, biochemistry, physiology, pharmacology, pathology, medicine, surgery, pediatrics and obstetrics.† To state that the aim of a medical school is to produce a general practitioner or a specialist or a research worker is to becloud the issue, for the ultimate field in which the graduate will practice is beyond the control of the institution. A knowledge of medicine must be imparted in 32 months, or 128 to 132 weeks, or 4,992 to 5,148 hours. Fortunately, or unfortunately, there is no general agreement in regard to the proportion of this time which should be required for any particular subject or to the amount of free time which may be granted the student for electives or independent study. The By-laws of the Association of American Medical Colleges recommend a curriculum of 3,600 to 4,400 hours and a percentage of time to be allotted to each subject.[2] This has provided a working basis, but further improvement is desirable.

Of the total of 5,148 available hours in the curriculum of the Johns Hopkins School of Medicine in 1926, 3,492 hours (68 per cent) were devoted to required instruction and 1,656 hours (32 per cent) were free for elective courses or anything else which the student wished to do. Although there was no compulsion in regard to the use of this free time, the students did not waste it. In fact, the impression was gained that frequently the free time was more profitably spent than was the required time, for the students had the added incentive of their own interest in the work which they did in their free time. Consequently, it was decided to increase the amount of free time so that the student could have more freedom in pursuing his course, for obviously all students are not equally interested in all subjects. It is sometimes felt that the student's interest in a particular subject should not be considered in planning a curriculum and that the faculty alone should decide the proportion of time which should be allotted to each department. This policy would be correct if all students went into the same field of medicine after graduation and required identical training, but most of them by the second or third year of medical school have decided the type of work which they expect to do; some are going into general practice, others will become surgeons, pediatricians, obstetricians, or research workers. It would, therefore, seem that two policies are open to the faculty: either to utilize all of the available time in required courses in each of the various branches and specialties, or to specify a sufficient amount of time for the major departments of medicine and to allow the student to choose whether he wishes to obtain a minimum of training in each of the specialties with the intention of going into general practice or to concentrate in one or another department if he intends to enter a specialty. The former policy is the usual one, but as a result during the past twenty years the curricula of most medical schools have become overcrowded with required instruction in numerous subjects. Every time a new specialty has developed a new course has been added without

*Read in Section on Medical Education, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

†Other branches and specialties are included in one or another of these major subjects, i. e., histology, bacteriology, therapeutics, psychiatry, neurology, dermatology, gynecology, ophthalmology, genito-urinary surgery, otolaryngology, hygiene, sanitation, etc.

TABLE 1
CHANGES IN THE NUMBER OF REQUIRED HOURS DEVOTED TO EACH SUBJECT.

	1926-1927 (Based on 33 weeks) Hours		1927-1928 (Based on 32 weeks) Hours	
First Year				
Anatomy	374		264	
Histology-Neurology	220		168	
Physiology	44		160	
Physiological Chemistry	165		144	
Bacteriology	121		88	
Pharmacology	.....		56	
Psychobiology	11	(935)	16	(896)
Free time	352		352	
Annual total	1287		1248	
Second Year				
Pathology	363		288	
Normal Physical Diagnosis	66		64	
Abnormal Physical Diagnosis	33		64	
Clinical Microscopy	66		96	
Diagnostic Methods	.....		32	
Physiology	231		0	
Pharmacology	88		0	
Surgery	33		0	
Laryngology	4		0	
Medical Psychology	22		16	
Medicine	66	(972)	0	(560)
Free time	315		688	
Annual total	1287		1248	
Third Year				
Obstetrics	115		100	
Medicine (including pediatrics and therapeutics)	368		296	
Surgery	241		144	
Gynecology	49		8	
Neurology	81		40	
Ophthalmology	16		12	
Hygiene	11		12	
Psychiatry	16		40	
Medical Zoology	11	(908)	8	(660)
Free time	379		588	
Annual total	1287		1248	
Fourth Year				
Medicine (including pediatrics)	363		312	
Surgery	264		208	
Surgical Pathology	0		16	
Ophthalmology	50	(677)	32	(568)
Free time	610		680	
Annual total	1287		1248	
Total required hours	3492	(68%)	2684	(54%)
Total free time	1656	(32%)	2308	(46%)
Total	5148		4992	

any diminution in the time required for the original subjects.

In pursuance of the second policy, that of liberalizing the curriculum, the Advisory Board of the Medical Faculty of the Johns Hopkins University last year adopted the following resolution:

(1) The degree of M.D. shall be given to those students who satisfactorily complete the minimal courses of a four-year curriculum, arranged on a skeletal basis of instruction and comprising required courses in the major departments of instruction. The required courses shall aggregate approximately 2,500 hours in the four-year curriculum, leaving roughly one-half of the student's time free.

(2) In addition to the minimal courses of instruction in each of the major departments, elective courses or additional opportunities for study should be offered in every department. In recommending a candidate for the degree, the additional work done by the student should be given consideration.

(3) The major departments of instruction shall be considered to be the following:

(a) Anatomy, including histology and neuro-anatomy.
(b) Physiological chemistry.
(c) Physiology.
(d) Pharmacology.
(e) Pathology, including bacteriology.
(f) Medicine.
(g) Surgery.
(h) Obstetrics, including gynecology.
(i) Pediatrics.
(j) Psychiatry.
(k) Ophthalmology.

TABLE 2
CHANGES IN THE NUMBER OF HOURS DEVOTED TO REQUIRED INSTRUCTION IN EACH YEAR.

Year	1926-1927			1927-1928		
	Required Instruction (hours)	Free time (hours)	Total (hours)	Required Instruction (hours)	Free time (hours)	Total (hours)
First	935 (73%)	352 (27%)	1287	896 (71.8%)	352 (28.2%)	1248
Second	972 (76%)	315 (24%)	1287	560 (44.9%)	688 (55.1%)	1248
Third	908 (70%)	379 (30%)	1287	660 (52.9%)	588 (47.1%)	1248
Fourth	677 (53%)	610 (47%)	1287	568 (45.5%)	680 (54.5%)	1248
Total	3492 (68%)	1656 (32%)	5148	2684 (53.8%)	2308 (46.2%)	4992

(4) Group examinations in the pre-clinical courses of instruction shall be held not earlier than the end of the second year, or at the end of any quarter thereafter. Not earlier than the end of the fourth year, or at the end of any quarter thereafter, group examinations shall be given in the clinical subjects. In all of these group examinations evaluation of the student's fitness shall be based not only on the results of the examination, but upon the judgment of the various instructors regarding the student's capabilities.

(5) Students registered in the School of Medicine shall be allowed to discontinue their regular medical courses at any time and devote a year or more to special studies in any subject.

(6) The greatest liberty in migration for various periods of time to other medical institutions shall be allowed by the executive officers of the school.

(7) The present method of selection of students shall be continued, so that the number of mediocre and poor students be kept as low as possible. The limitation of enrollment shall be maintained at 300 students in the School of Medicine, divided roughly into four classes of 75 students each.

(8) The Committee on the Curriculum shall be authorized to arrange the required courses of instruction on the basis of the foregoing recommendations and the Committee shall be empowered to put the recommendations into effect as rapidly as possible.

With the increase of medical knowledge, there has come the realization that no student can master all of the subjects in the medical curriculum within four years. The problem now, to quote Berglund,[3] is "What to teach and what to skip." There is, of course, no unanimity of opinion in regard to the answer to this question, but with the cooperation of the heads of the various departments, the Curriculum Committee finally recommended a skeletal schedule which, in their judgment, contained the minimal number of hours necessary for a basic training in each of the major subjects. The total decrease in required instruction was approximately 25 per cent. Wherever possible didactic lectures were abandoned. In some subjects the reduction was greater than in others, depending upon the recommendations of the heads of the departments; in abnormal physical diagnosis and in diagnostic methods (for example, x-ray, ophthalmoscopy and otoscopy), the allotment of time was not decreased. There was no attempt to obtain a uniform reduction; the requirements of each department were considered separately. The details are given in *Table 1*. In order to make the schedule more flexible, the curriculum was arranged in four quarters of eight weeks each instead of in three trimesters of eleven weeks, or a reduction in the total annual number of weeks from thirty-three to thirty-two, or in the annual total of hours from 1,287 to 1,248.*

A summary of these changes is given in *Table 2*. The greatest increase in the amount of free time was in the schedule for the second year. This was accomplished by transferring physiology and pharmacology from the second to the first year with the object of giving the student a more varied curriculum early in his course and thus enabling him to choose elective courses from a wider range of subjects. An effort was made to give the student consecutive free time rather than isolated hours of leisure. In the second, third and fourth years the free time has been concentrated so that one or more quarters are entirely free.

The class of 75 students is divided into groups of 8 to 20 for most of the required instruction. The students are allowed to choose their group, but if more than 20 desire any one group, the names are accepted in order of application. The four groups rotate through a schedule in different quarters. For instance, in the first quarter of the third year group A has required instruction in medicine, group C in surgery and obstetrics, group D in ophthalmology, psychiatry and neurology, and group B has an elective quarter. Various clinics are given daily from 12:00 to 1:00 in each quarter, at which attendance is required for three quarters.

*This total reduction is more apparent than real, for the time for examinations was included in the 33 weeks of the former schedule; under the new plan a 33rd week of examinations is added at the end of the second and fourth years.

TABLE 3
THE PERCENTAGE DISTRIBUTION OF THE TIME DEVOTED TO REQUIRED INSTRUCTION IN EACH SUBJECT.

SUBJECT	1926-1927		1927-1928		Association of American Medical Colleges recommendation (per cent)
	Hours	Per Cent	Hours	Per Cent	
Anatomy (incl. Histology)	594	17.1	432	16.1	14.-18.5
Physiology	275	7.9	160	6.0	4.5-6.
Biochemistry	165	4.7	144	5.4	3.5-4.5
Pharmacology	88	2.6	56	2.1	4.-5.
Pathology (incl. Bacteriology)	484	13.7	376	14.0	10.-13.
Hygiene and Sanitation	11	0.3	12	0.4	3.-4.
Medicine (incl. Psychiatry, Pediatrics and the medical specialties)	1103	31.6	984	36.6	20.-26.5
Surgery (incl. Ophthalmology and the surgical specialties)	608	17.4	412	15.4	13.-17.5
Obstetrics (incl. Gynecology)	164	4.7	108	4.0	4.-5.
Total	3492	100	2684	100	

In *Table 3* is given the percentage distribution of the number of hours allotted to required instruction in each subject in the 1926 to 1927 and the 1927 to 1928 curricula. With the exception of pharmacology, hygiene and medicine, the distribution is similar to that recommended by the Association of American Medical Colleges.[2] The deficiency in pharmacology is partly explained by the fact that therapeutics is taught in the medical department instead of in pharmacology, as is customary in some other medical schools. The apparently small allotment of time to hygiene is due to the inclusion of the majority of the instruction in preventive medicine in the schedule of the medical department. It is felt that the prevention of typhoid fever, for instance, can be taught better in connection with a medical clinic on typhoid fever than in a separate course in hygiene. The whole curriculum is permeated with preventive medicine. The consensus of opinion among the faculty was that clinical medicine should be the backbone of the curriculum and, therefore, more than one-third of the required instruction is in that subject.

During the free time numerous elective courses are offered by each department. The number of these courses has been greatly increased. However, a student may pursue independent work in any subject, he may do research work or he may obtain leave of absence to attend another medical school. It is felt that spending one or more quarters at another institution either in this country or abroad will be of great value to every medical student, and this migration is encouraged.

There is no compulsory supervision during the free time and there are no examinations at the end of each course. After all, one of the chief functions for which the course examinations were designed, namely, to eliminate the student who should not have been admitted, has now apparently been made unnecessary, or at any rate less essential, by the present method of selection of students.[4] Formerly, there were from ten to fifteen failures every year, but so far among the students selected under the new plan only one or two have had to leave the school at the end of each year. However, in order that the public and the school may be protected from inadequately trained graduates the group examinations in the pre-clinical subjects at the end of the second year and in the clinical subjects at the end of the fourth year will be comprehensive and demand a more complete knowledge of medicine than can be obtained from the required courses in the schedule. In other words, the reduction in the amount of time in the required instruction does not mean that additional study is unnecessary. The choice of this work, however, rests with the student rather than with the faculty, but he must demonstrate that he has utilized his free time profitably. The former numerical system of grading has been abandoned and only the record of "passed" and "failed" will be used.

It is hoped that these comprehensive or group examinations in all of the pre-clinical and all of the clinical subjects will give a student an entirely new point of view and that, instead of completing long required courses which he usually assumes were designed by the faculty to give him all that he should know about each subject, he will realize that his short required courses have merely been a foundation upon which he must build if he expects to pass his examinations. He must commence in his free time the process of self-education, which is so

necessary to success in medicine. Another advantage of comprehensive examinations is that they enable a student to learn the relationships of the various branches of medicine to each other. He must bring his knowledge of anatomy, physiology, pathology, and so forth, to the same point at the end of his second year rather than, as is usual at present, learn anatomy, pass his course examination and then forget while studying physiology that anatomy has any relationship to it. Comprehensive examinations will probably unlock the "water-tight" compartments of the various branches of medicine and increase their correlation. It is probably true that the faculty will find in these comprehensive examinations that a student will not know as many details as he formerly did in his course examinations, given immediately after the completion of his study of the individual subjects but, after all, the essential feature of any medical examination should be to ascertain the fitness of the student to practice medicine rather than to test his success in completing any one particular course. In medicine, for instance, if a student understands the basic methods of taking histories and of examining patients and can logically collect and analyze the information he has gained so that he can make a correct diagnosis and institute proper treatment, he probably will be a better physician than one who can enumerate a detailed list of diseases with their symptoms.

The members of the faculty are ready to give advice to any student who wishes it and it is hoped that those who intend to enter any particular field will confer with the head of that department so that a departmental program can be followed. For example, if a student has decided to become a pediatrician, the professor of pediatrics might advise him to divide his 2,308 hours of free time somewhat as follows: 150 additional hours in anatomy and histology, 200 in physiology, 250 in biochemistry, 50 in pharmacology, 600 in pathology and bacteriology, 450 in medicine, psychiatry and the medical specialties, 200 in obstetrics, surgery and the surgical specialties and 400 in pediatrics. The student should spend part of his time in study at another American or European medical school. Other advisors would probably recommend a different program and the student should make his own decision in regard to the most profitable course to pursue. If he wishes to enter general practice, and there should be a larger number every year, for the specialties are becoming crowded and the opportunities in general practice are increasing, he could profitably study the analysis of the average work of a medical practitioner which Bass[5] has recently made and prepare himself for the problems which he will encounter.

SUMMARY

An experiment in liberalizing the curriculum is being made at the Johns Hopkins University School of Medicine in the hope that by allowing the student more freedom in planning his course a better trained graduate may be produced.

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Discussion follows paper of Dr. Marshall, page 993.

THE MEDICAL CURRICULUM*†

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Within slightly more than a generation changes have taken place in medical teaching which amount to a revolution. Subject matter, methods and points of view have been altered, often profoundly; much of the old has been discarded, more and more of the new woven into the fabric of our teaching. And yet the curriculum as it stands, elaborate, modernized, standardized, is far from satisfactory. It is a target for pointed criticism and stands in its present form less by reason of its own strength than of the absence of unity of attack by the critics. We are told that the curriculum is too crowded, and yet additional studies are continually being proposed; we hear that subjects receive too much time, and as positively that they need more; that there is too much specialization in teaching, and that the student

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†From the Laboratory of Pathology, University of Virginia.

learns nothing thoroughly; that the age of graduation should be lower, and that students should spend another year or two before receiving their diplomas.

Many articles wax eloquent in praise of the inspiring teacher; it is he who makes the school; let him teach as he chooses and he will turn out fine physicians; no restrictions must be placed upon him in his selection of teaching methods. Elsewhere we hear a different tune; it is the student that really counts; there is too much teaching; turn the student loose, let him browse, let him teach himself, let him learn medicine in the free air of independence. Again, such eminent authorities as Wilbur and Mayo utterly condemn lectures and those who lecture; attendance on lectures should not be required; no examinations should be allowed on subject matter covered in lectures; students waste their time in lectures; they can get all that the lectures give from books and get it better. In short, lecture and lecturer should be banished from the curriculum with bell, book and candle.

We are told most solemnly by Bevan (1920) and Pritchett (1920) that the first duty and purpose of the medical teacher is to train men for general practice, while Flexner says the salvation of medicine lies in natural science; Winternitz advocates for medical schools the university ideal of knowledge for its own sake, regardless of practice; the Commission of Curriculum (1922) asserts it should be a prime requirement of education in medicine that it assist the development of individuality, and Billings (1922) says "fundamentally we (the medical teachers) want to turn out an educated cultured individual." From Graham it appears that "general practice" of the older days no longer exists; that we do not know how to train and direct our students into "general practice," that we are rather in a fog as to what "general practice" is, anyhow, and that we hardly can say precisely what we ought to train our students to do, or to be, and we need not puzzle our heads over it anyhow.

We are told that because of impractical highbrowism in medical school management there are no longer physicians for the countryside, and, in reply, that the choice of locations by medical graduates depends only distantly and indirectly on the medical school requirements and is part of the great social and economic revolution of our time.

We are told that our high standards are so reducing the output of medical graduates that a popular and political revolt is threatening, and, in answer, that there is no threatened shortage of physicians and that any lowering of standards is bound to be detrimental to the public welfare, harmful to the morale of the medical profession, a breach of trust on our part as guardians of our intellectual heritage and ideals.

The form and material of the prevalent medical curriculum is the fruit of devoted study, and, it must be added, of circumstance; the modern medical school is recognized as a distinctly marked variant, possibly as a mutant species, so different is it from the older medical school stock, and yet we are told that it is all wrong, that our whole attitude towards the student and our respective subjects needs revision, that the intellectual objectives of the university graduate schools must be held more prominently before us; that we must pay little attention to how much we teach our students, greater attention to the selection of what we teach, but chief attention to obtaining, as the product of our schools, students so accustomed to the inductive methods of natural science as to employ them as conditioned reflexes. This, we are told, is the very highest goal of achievement for the medical school. In other words, psychological training in the use of the methods of induction is of major importance in medical education. In striving for this, the student will develop scholarly habits, will gain independence and maturity through research, will acquire adequate informational data, will acquire a wholesome and reliable equipment with which to face the professional puzzles of his career. Moreover, our graduating student should be less a stuffed sausage, more a highly trained and sensitive intelligence; less a dulled slave of the machine, more a high-spirited adventurer eager to pit his wits and weapons against the powers and pitfalls of the demon, disease.

On some points most critics agree. The curriculum is too congested, a condition becoming worse as knowledge accumulates. Moreover, there should be earlier contact between medical student and patient, and, finally, the independent motions in the several clinical and pre-clinical spheres need a stronger centripetal attraction in order to bring harmony and cohesion into the system and insure correlation between the "sciences" and "arts" of medicine. The student should attain not merely an abstract knowledge of the medical sciences, not merely a clinical intuition; he must think of his patient

in his entirety, omitting neither personality nor the separate biological sciences which may have a bearing on the case; truly we are harking back to Hippocrates!

These three objections to the curriculum have been made for ten or twenty years with increasing force, while, during this period, advances have tended to reduce the difficulties in at least one direction. Bringing all the branches of the medical school and hospital into close contact, or under one roof, along with other advantages, makes possible a variety of close contacts between the several departments, and should make teaching correlation not only possible, but more or less inevitable. Schools like Vanderbilt and Rochester, with their modern, compact organizations, should be able to explore the possibilities of medical correlation under most advantageous conditions.

It is not only through new building programs that efforts have been made to attack the three features of the curriculum selected here for special criticism. About five years ago the curriculum became again a major object of interest to the Association of American Medical Colleges, and subsequently much has been said on the subject at the Association conferences, in the Southern Medical Association and elsewhere. Practical suggestions have been made by Edsall, Wilbur, de Schweinitz, Pepper, E. R. Clark and others, and various experiments have been made or are under way. Five years ago Ryerson advocated a sharp revision of the curriculum, introducing the now familiar expressions "horizontal" and "vertical" curricula, carrying both clinic and laboratory through each of the four years. At Yale and the Johns Hopkins unusual efforts are in progress to establish medical education on a complete graduate department basis.

In this article an attempt is made to outline a curriculum to give greater cohesion or "correlation" to the student's work. A conception of the curriculum is advocated, not radically new, but not generally accepted. While attempting to conserve the good things secured in a generation of progress, student laboratory and patient meet earlier and oftener in the course. The curriculum here outlined is a modification of that proposed by Ryerson, and, indeed, I doubt that I shall make many suggestions not already contained somewhere in the literature of the last ten years. It is my opinion that a curriculum of this kind gives promise of revealing opportunities for reducing hours of class work, of lending elasticity to the teaching plan and of stimulating research.

At present medical teaching is based on the specialist teacher. The student goes to a laboratory and works there until he completes the assigned study. Then he goes to another special department, another and another, never returning to the earlier departments of study, and only by chance securing close correlation between his several laboratory studies and between those and his later clinical work. In place of this, a modified symposium method of teaching is recommended, with a schedule which will secure for the student a rounded perspective of each subject in turn, from both laboratory and hospital viewpoints, and with continuing contact with subjects once covered.

I suggest that a staff of specialists bring a few selected subjects in broad perspective before the students as a substitute for our custom of sending students around to various special departments to acquire various detached bits of medical or scientific knowledge.

While there are many arrangements possible for a curriculum such as I propose, I have followed rather closely the order of teaching in anatomy and physiology at the University of Virginia; have allowed the same number of hours per subject now in our schedule, and have made no attempt to shorten courses or save time, matters deserving consideration after trial of the schedule. I am indebted to my colleagues for their courtesies and aid in working out the time quotas for my various subjects. I have also used the session, term and weekly time standards of the University of Virginia.

The main divisions of the curriculum for the first two years of the medical school will be:

(1) Introductory studies, anatomy and bacteriology.
(2) Muscular movement and muscles, bones, tendons, joints and skin.
(3) The heart, arteries, veins and the circulation.
(4) The blood, omitting the biochemical aspects.
(5) Respiration and the respiratory system.

In the second year:

(6) Foods, nutrition and digestion.
(7) Absorption and metabolism, including growth and old age.
(8) Excretion and the organs of excretion.
(9) Internal secretions and endocrin organs.
(10) Reproduction and embryology.
(11) The nervous system and its workings.

(12) The special senses.

In the third or fourth year:

(13) Medical aspects of the mental processes.

During the first two years each of these subjects except the mental processes will in turn be taken up in the laboratories and a few appropriate clinical cases presented as focal points for the laboratory studies. In general, work in the several laboratories may be discontinuous and the student will devote his entire time to the various aspects (anatomical, biochemical, et cetera) of one subject before taking up another, a plan which cannot be rigidly followed.

At the end of his second year the student will enter on his clinical studies as usual. The curriculum as here outlined covers only two sessions.

In the first period of thirteen weeks the student starts upon the usual studies in anatomy and dissecting, and takes up bacteriology. The course should be so arranged that histology will largely keep step with gross anatomy as a single teaching course, as is done at Pittsburgh. In December the students will focus particular attention upon muscles, motor nerves, tendons, joints, bones and skin. There need be no examinations at the end of the first term. The methods of physical diagnosis will be started and will keep pace with dissections. X-ray plates will be studied in connection with dissection.

The time at present available in our curriculum between September and Christmas is 13 weeks of 34 class hours per week, or 442 hours in class work with deductions for holidays. Of this, bacteriology requires 144 hours, leaving 290 hours for anatomy, gross and microscopic.

After Christmas, dissecting and histology continue; physiology and pathology are started. In physiology the usual studies in muscle nerve are followed by studies of muscular coordination and the biologic mechanisms of various joint movements. There may well be a certain amount of team work here between the anatomical and physiological departments. Meanwhile, in pathology, regressive changes and the general phenomena of inflammation, scarring and contraction are studied, with illustrations from joint and bone, muscle and skin.

After these studies are well forward, probably about the end of February, orthopedic cases are exhibited, selected to illustrate especially the muscle-joint-tendon lesions and contractures. The students will start a "case index file" with the beginning of the clinics; they will be called upon frequently to make their own observations as to departures from normal shown by the selected cases. These illustrative cases may be presented in amphitheater, ward or out-patient service, to the whole class or to groups.

The clinical demonstrations, lasting one hour once a week, are immediately followed by one hour of lecture room or amphitheater "conferences," at which the anatomist, physiologist, histologist, pathologist or bacteriologist discusses briefly the bearings of the selected cases on the corresponding science, and vice versa. By prearrangement between the orthopedist and the pre-clinical departmental heads one or perhaps two of the pre-clinical group may discuss each of the cases selected in a five- or ten-minute talk. By arrangements between the orthopedist and the pharmacologist and head of the department of preventive medicine, each of these departments will be included in the "conferences" sufficiently often to put them in the role of "conferees," along with the pre-clinical departmental heads, and to permit them to place their specialties in the proper perspective as part of the cases exhibited.

The illustrative orthopedic cases may be used thereafter variously in the pre-clinical laboratories for purposes of more detailed and critical studies. For example, in pathology, the lesions may be further studied and their pathological relationships followed and differentiated. The cases exhibited may be made points of departure from which to suggest special studies for some or all of the class.

Between January and June, in 168 hours, the class in physiology will probably cover muscle-nerve, muscle-joint, heart and circulation, physiology of the blood and of respiration. As each of these subjects is reached, a class period or two in anatomy and histology and physical diagnosis of the chest precedes the physiology studies; selected aspects of the pathology fit in toward the close of the physiology, and at the appropriate time a few patients carefully selected to give point to the pre-clinical studies are brought forward at the weekly clinics and "conferences." The cases presented are in turn made focal points in the physiology and pathology classes. The same general plan of procedure should be followed in the clinics and conferences as was outlined above. As the session advances there will be successively presented to the class (1) patients with bone, joint or muscle disability; (2) cardiac or vascular disease; and (3) circulatory disorders; (4) one or

two respiratory cases; (5) one or two blood cell diseases.

Beginning toward the last of February in the first year and continuing to the end of the second year, the material from current autopsies will be studied during one hour of each week.

As no examinations are needed at the end of the second term, it will run 11 weeks instead of 10 as it now does. The time available in a 34-hour week schedule is 374 hours (11x34). Of this time physiology will receive 88 hours, pathology 88 hours, the clinics 5 hours, "conferences" 5 hours, autopsy reviews 5 hours, and anatomy about 183 hours.*

In the third term of ten weeks on a 9 to 1 schedule, six forenoons, and 2 to 4 for five afternoons per week, 340 hours are available for class work. Physiology will use 80 hours, pathology 80 hours, clinics 10 hours, conferences 10 hours, autopsy reviews 10 hours, anatomy 20 hours. Biochemistry will have 120 hours for study of foods, intestinal putrefaction, and feces and digestion.

In summary, the subjects and time quotas for the first session are:

	Hours 1st Term	Hours 2d Term	Hours 3d Term	Hours Total
Gross anatomy	290 { 212	183 { 135	63	410
Histology	290 { 78	183 { 48	....	126
Bacteriology	144	....	....	144
Physiology	....	88	80	168
Pathology	....	88	80	168
Autopsy reviews	....	5	10	15
Biochemistry	....	....	77	77
Clinics	....	5	10	15
Conferences	....	5	10	15
Totals	434	374	330	1138

According to this outline, during the first year the medical student will complete systematic medical bacteriology, will complete one dissection, will have a rounded knowledge, though lacking in detail and depth, of bones, joints, muscles and tendons, with some of their relationship to skin and nerve, and will just about complete a similar rounded study of the heart and circulation and of the respiration and blood. He has learned to connect x-ray data and the data of physical diagnosis with his studies in anatomy and physiology through elementary practice. For fifteen weeks he has made weekly comparisons between the normal tissues of his anatomic studies and the current autopsy material. For fifteen weeks he has seen and come into contact with patients selected to give point to his immediate laboratory studies. He has also laid a foundation in biochemistry for his second year work.

Both by the method of presentation and especially by the conferences he must be impressed with the unifying bonds between the several special departments, and will have laid the foundations of a habit of thinking not exclusively in the lines of a single special field, but with a broad biologic horizon.

Finally the arrangement is well suited to training the student to observe for himself, to compare and contrast his findings with other data, to focus his entire resources for ready use, to develop a judicial and balanced critical habit of mind, to discover the limits of present knowledge.

In their second year the students will begin with a symposium treatment of the alimentary tract. A short time will be given to the study of the gross anatomy by prepared demonstrations and models. Two weeks will be given to a detailed histologic study with incidental review of the embryology. Attention will then be concentrated on the physiology and biochemistry, and this will be followed by study of diseases of the alimentary tract in pathology and with clinical demonstrations of the alimentary tract from both medical and surgical services. The clinics will continue once a week and will also include occasional cases illustrating the subjects covered in the first year. The autopsy reviews will continue.

Immediately following the "alimentary tract," the subject of nutrition and metabolism will be considered by the physiologist, biochemist and pathologist, and clinical examples, especially from the pediatric service, will be included. This will be followed by the study of excretion with attention concentrated in turn upon the anatomy and histology, the physiology and biochemistry, and the pathology and clinical examples. The pharmacology applicable to these subjects will be brought in at this time and the personal and public health aspects will be presented.

There will be given a short period to normal and abnormal growth and decay, beginning with the infant and with experimental animals in the laboratory either of physiology, biochemistry or pathology. Illustrative cases may be drawn largely from the pediatric service.

The endocrin system will be covered in the

*Instead of teaching all of histology in a block, 72 hours are deferred to the second year along with 90 hours of embryology, distributed at appointed times as follows: alimentary tract, genito-urinary tract and nervous system, each 2 weeks of 9 hours per week, and skin and reproductive organs each 1 week; total, 8 weeks of 9 hours = 72 hours. At present histology is assigned 12 weeks of 9 hours + 10 weeks of 9 hours=total 198 hours. Histology will need 198—72 hours in the first year=126 hours of first and second terms, or 14 weeks of 9 hours each, or 10½ weeks of 12 hours each.

same way, with attention successively to anatomy, histology, physiology, biochemistry, pathology, clinic, pharmacology, and personal and public health aspects.

The second-year students will begin in January with the same kind of study of reproduction, including the histology and embryology, with obstetrical aspects of the developing embryo and the physiology of reproduction. Brief attention will be paid to the pathology of the fetus, developmental anomalies, hereditary diseases and congenital tumors. In this series of studies the obstetrician is expected to take an active part in determining the matter to be presented, both in the clinic and in the laboratories. This will be followed by the study of the central nervous system, peripheral and central. For this seven weeks is allowed. The last three weeks of the second year is scheduled for the study of the special senses.

In the first term of 12 weeks there are 400 hours of class work, leaving one week for examinations before Christmas. The schedule will be apportioned as follows:

Biochemistry	133 hours
Gross Anatomy: alimentary, 2 hours; excretion, 2 hours; reproductive, 2 hours	6 hours
Histology: alimentary tract, 24 hours; kidneys, etc., 24 hours; reproductive, 9 hours	57 hours
Physiology: alimentary tract, 8 hours; kidneys, etc., 25 hours; reproductive, 11 hours; nutrition, 7 hours	51 hours
Pathology: alimentary tract, 32 hours; kidneys, etc., 27 hours; reproductive, 18 hours	77 hours
Autopsies	12 hours
Clinics	12 hours
Conferences	12 hours
Pharmacology	40 hours
Total	400 hours

In the second term, 340 hours, pharmacology and materia medica receive 120 hours, embryology 100, and 30 hours in all go to clinics, conferences and autopsy reviews. The nervous system takes the remainder of this term. (Gross anatomy and histology, 78 hours; physiology, 10 hours; pathology, 12 hours.)

Embryology should be taught in a combination something like the following:

Embryology (histologic)	80 hours
Gross anatomy of reproductive organs	2 hours
Physiology of reproduction	5 hours
Obstetrician's presentation	12 hours
	99 hours

In the third term, 340 hours, the schedule includes:

Pharmacology	80 hours
Physical therapy	20 hours
	100 hours

The Special Senses:		
Gross anatomy	3 hours	
Histology	9 hours	
Physiology	9 hours	
Practical aspects by practitioners	9 hours—	30 hours
Physical diagnosis		40 hours
Preventive medicine, personal and public aspects		100 hours
		270 hours

The clinics, which form an important part of this curriculum, should be diversified in arrangement and conduct. At least a few cases presented to the entire class during the first and second years should be prepared for quite carefully by both the clinician and the pre-clinical department heads. After the clinical presentation, the pre-clinical teachers should discuss the selected cases and point out the relationships pertaining to their specialties. This may be made to serve not only the needs of the younger students, but of the older ones. Some of these conferences may be in the nature of consultations and it may be that in one instance the biochemist may offer suggestions of procedure or of research; in another the physiologist may play the more important role. In any event, the cases presented should be referred back with adequate data to each of the pre-clinical teachers and each of them should make a definite, concrete effort to discuss the cases presented when next he meets his class. Opportunities should be scheduled so that every pre-clinical teacher may have a period to review the clinical cases.

At the end of the second year will come examinations in the laboratory subjects. While it may be appropriate to have detailed examinations for each technical subject, like anatomy, or physiology, there should also be employed a "general examination" along the lines now customary at Harvard, either as questions given in the several specialties, or as a separate examination. The "general examination" at the end of the fourth year should also be made part of the scheme here outlined.

It may be objected that this curriculum cannot be used without great confusion; that the student will be baffled by the rapid shift from one specialty to another; that it will be impossible to teach in a coherent manner on such an intermittent schedule. It may be noted, however, that there will be no confusion after the novelty of the arrangement has worn off, and that students should find this curriculum less baffling than the existing ones, as this will focus

attention on one main thesis at a time with the illumination of the thesis widening progressively.

With regard to teaching, each teacher will have at least as many hours with his students as he has now, and in addition will be able to make special points at the "conferences." The attempt is made in this schedule to provide a basis for coherence in teaching. For example, anatomy is continuous until one dissection is complete, by which time the student has a vocabulary and has started to think in terms of anatomy. Physiology is continuous until the student gains a view of the body as a working mechanism. In the same way each specialty has an unbroken period in which may be exploited the special aspects of the department. The chief innovations are: the shift of the center of gravity from the specialist to the patient-as-a-whole, supplying thus a centripetal force to influence the motions of the specialties; and second, the decentralization of the special laboratory studies by the erection of the dozen focal subjects around which the laboratory studies successively group.

The "conferences" may be also rather an innovation. The laboratory men, however, need be no less scientific even though they meet with insoluble questions at the clinics; the clinicians need be no less practical if, once or twice a year, a laboratory man injects a haunting question.

The chief difficulty in the use of this curriculum will be the practical one of avoiding conflicts of two classes meeting in the same laboratory at the same hour. Preliminary drafts indicate that this matter can be managed, though the difficulty may be greater if the classes are divided into sections.

In conclusion, it seems to me that through a curriculum of this kind we go directly and frankly toward those objectives talked of for so long by the "correlationists;" we go along paths which have proved successful in systems of medicine and many special treatises, and familiar as the way in which any of us older men would attack a new subject if called on to learn it.

DISCUSSION (*Abstract*)

Papers of Dr. Davison and Dr. Marshall.

Dr. V. P. Sydenstricker, Augusta, Ga.—These two papers express what everyone feels most keenly, that is, the overcrowded condition of the medical curriculum. Dr. Davison's plan is ideal in every respect; it is suitable to the school in which it has been applied because the students are well trained and the staff is large. Under these conditions it is a solution which can be applied to the smaller schools also. It requires more effort to give a man inspiration and stimulate his imagination in order that he may find out things for himself. That is much more difficult than to give him didactic lectures three or four times a week.

As to the exact division of time, each medical school is an entity unto itself. There can be no arbitrary standard because different schools have different objectives in the training of students; the final arrangements must rest with the school itself.

Dr. Marshall's curriculum is a most attractive one, for it brings the first year man into contact with the patient immediately and maintains this contact throughout the entire four years. Certainly a man who has seen a brachial plexus palsy has less trouble in remembering the anatomy than when he has learned it from a book; a patient with furunculosis impresses staphylococcic infection on the student's mind much more forcibly than a culture in a test tube. I think that along these lines we have an opportunity for enormous advances in our teaching if we can rid the curriculum from the dead weight of didactic lectures. Let the student from his first year see that the patient is the real goal of his training and we will accomplish as much as was accomplished twenty years ago when the revolution in medical education first started.

Dr. Stewart R. Roberts, Atlanta, Ga.—Apparently we all seem to be thinking the same thing and expressing it from a different point of view. Here is a remarkable point of view from the Johns Hopkins Medical School, Dr. Young admitting that the requirements have been too high and that the men are graduating too late. I heard a distinguished man say yesterday: "My son is 27½ years old. When is he going to begin to practice?" I have been steadily and quietly getting the view of the senior class as to their estimate of the value of the teaching. Roughly the senior class estimates that 25 per cent of the teaching is theoretical and that only 50 per cent of the teaching from the beginning of the freshman year is practical and valuable. Now that from the standpoint of the student intimates Dr. Davison's point of view, that the curriculum can be greatly reduced in the number of hours for lectures.

Two years ago at Emory we attempted to get the professors to attend the meetings at the University hospitals. So far, with the exception of the professor of pathology, we have had but one member of full time who is a regular attendant.

Last winter I went through the medical schools of Ireland and England and, instead of calling on the distinguished members of the staffs, I visited the interns in their quarters. I found they had the best of foreign literature and read it. I have visited the interns in American colleges and found no current literature except perhaps the *Red Book* or the *Saturday Evening Post*.

I wish to call attention to Dr. Davison's remarks about the examination. We are wasting from four to six weeks on examinations in the medical curriculum. I attended the elective classes in the University of London School of Medicine, and I found those students were not burdened with fear, but were rather gifted with interest. They did not have the bugbear fear of passing the examination and I saw thirty students in their elective year taking a course in pathology. They

are not burdened with examinations until the close of the senior year. We must begin with the needs of the students in the problem of clinical medicine.

Dr. Allan M. Chesney, Baltimore, Md.—In regard to the students' not knowing what subjects they want to take, I have been analyzing what the present fourth year class, who have had the opportunity to elect subjects, have decided to take. The course in urology given by Dr. Young and Dr. Frontz is the most popular one of the whole group.

Dr. Davison (closing).—Most medical students, by the beginning of their third year, have determined whether they are to go into general practice or become specialists. The former, in their free time, can take short courses in a variety of subjects, while the latter can concentrate their free time in their chosen field. Another advantage in increasing the amount of free time is that the students frequently study with much more intensity in their elective courses than in those which are required.

Dr. Roberts has commented on the superiority of the culture of the British intern. It is interesting that one of the arguments for requiring four years of college is that they supply the American physician with a cultural background. The average British medical student, however, acquires his culture at home and at school and rarely studies cultural subjects at a university. At Oxford, for example, all of his time is spent in biology, physics, chemistry, anatomy, physiology and biochemistry. It would seem that the cultural value of our college course has been over-valued and that no preference for admission to medical school should be given to candidates who have had more than two years of college. Any student who has intelligence and character should be able to obtain his M.D. degree in five years after high school, that is, two years of college and three years of 44 weeks each in medical school.

DIABETES MELLITUS IN THE NEGRO RACE: A STUDY OF ONE HUNDRED CONSECUTIVE CASES*†

By Harold M. Bowcock, M.D.,
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No comprehensive study of diabetes mellitus in the American negro has appeared in medical literature. This condition, as observed in the colored race, presents many interesting points of comparison and contrast with the same disease in the white race. Lemann has published several valuable papers on special phases of this disease in the negro.

The statistical study of disease presents sources of error; this is particularly true of diabetes, in which so much importance is attached to accurate data upon age, weight, and duration of symptoms. Nevertheless, the following material has been collected, partly with the hope that it might stimulate the further study of diabetes in large negro clinics. So far as it has been possible, the data has been arranged in tables similar to those appearing in Joslin's fourth edition of "The Treatment of Diabetes Mellitus," so that comparisons might be made more easily with his extensive statistical material from the white race.

The data from one hundred cases of diabetes is derived exclusively from hospital records for sixty-four cases, from combined hospital and out-patient records for twenty-eight cases, and from out-patient records only for eight cases. Since the beginning of the colored hospital during 1921, there have been 26,858 admissions to all services; among this number there have been 113 admissions for diabetes, representing an incidence of 4.2 per thousand admissions. This figure is greater than the incidence of 3.4 per thousand colored patients found by Lemann[1] for the period 1921-1926 in the Charity Hospital, New Orleans, and very much higher than his earlier incidence figures.[2] The 113 admissions represent 92 individuals; many of these have had one or more readmissions. The diabetic out-patient clinic was started during October, 1926, and since that date 36 cases of diabetes have received ambulant treatment. The clinic cases have presented an opportunity for the collection of fairly complete data since they have been under the care of one individual and a definite program of study has been followed. *Table 1* presents the clinic data in summary form. The hospital and clinic records are combined in the following discussions.

Sex Incidence.—Seventy cases of the series of one hundred patients are females, showing the low incidence of 30 per cent males, in contrast to 57 per cent males among 4,786 admissions to the medical wards of the hospital.[9] Most statistics in the past have shown a preponderance of male over female diabetic patients in the white race. Joslin's figure[3] for 2,440 white patients during the period 1898-1922 was 55 per cent males, but his figure for 2,646 patients seen during the period 1922-1927 is 45 per cent males. Explanation for the extremely high comparative incidence of the disease among colored females may possibly be found under the discussion of obesity.

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*From the medical services of the Colored Division, Grady Hospital, and the J. J. Gray Clinic of the Department of Medicine, Emory University School of Medicine.

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TABLE 2
AGE AT ONSET OF DIABETES BY DECADES: 71 CASES

Age at onset, years	1-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79
Male	0	0	6	8	7	2	0	0
Female	1	3	5	11	15	12	0	1
Total	1	3	11	19	22	14	0	1
Per cent	1.4	4.2	15.5	26.8	31.0	19.7	0	1.4

Frequency of Onset of Diabetes by Decades.—*Table 2* comprises 71 cases in which the record of the time of onset of the symptoms of diabetes seemed to be reasonably accurate. When compared with white statistics, the percentages suggest that after the second decade diabetes appears about ten years earlier in the negro than in the white race. Davison[4] has found the earlier appearance of heart disease in the negro, and Hugh Wood and Abner Calhoun[5] the earlier occurrence of hypertension and arteriosclerosis as compared with the white race. It is not possible to explain the absence of male diabetics from the first and second decades of the series. Possibly, the lesser incidence of whatever metabolic disturbance influences the later development of obesity in the colored male may act as a factor; such an explanation is suggested by a study of the weights of the small male group which has developed diabetes as compared with the corresponding data in the female group.

Duration of Diabetes.—The records for 72 patients state the probable duration of symptoms previous to the time of examination. In 32 cases diabetes had been present for over two years. The greatest duration was 17 years, in an obese colored physician. Thirteen of the patients with diabetes of long duration experienced the onset of symptoms during the fifth decade; this is the decade showing the greatest number of cases of a known duration above two years.

Obesity.—Obesity seems to be the most important single factor influencing the development of diabetes in the negro. The extent of its occurrence can be noted in *Table 1;* the hospital records were not suitable for inclusion under this head. Of 34 clinic cases, 26, or 76.5 per cent, had had a weight more than 10 per cent in excess of the average standards for white individuals of the same height and age.[6]* Considered according to sex, 3 males, or 33 per cent, had been more than 10 per cent overweight, while 23 females, or 92 per cent, had been more than 10 per cent overweight. Even though it may be incorrect to compare negro weights with white standards, the much greater incidence of obesity among the females of this series is obvious.

Influence of Occupation.—Among 85 cases in which the occupation was recorded, 17 were cooks, 5 were maids, and one patient was a candy maker. These figures are given as a matter of interest, since the occupation may have presented opportunities for overeating, with the subsequent development of obesity.

Syphilis.—Syphilis does not seem to be an important etiological factor in this series. The Wassermann was reported in 85 cases. In 3 cases the result was doubtful and in 12 patients it was positive. The incidence of positive results was 14.1 per cent. This is somewhat less than the serologic evidence of syphilis among all colored hospital cases. Paullin, Davison and Wood[9] estimated that syphilis was present in between 17 and 22 per cent of 47,850 new patients admitted to the outpatient department, and positively present in 13.8 per cent of 4,786 patients admitted to the medical wards of the hospital. Anti-syphilitic treatment has not cured the diabetes or seemed to influence the course of the disease. Lemann[7] has emphasized the lesser occurrence of positive Wassermann tests among diabetic than among non-diabetic negro patients.

Arteriosclerosis.—Clinical arteriosclerosis as determined by the examination of peripheral vessels or retinal vessels was present in 43 cases, or 55.1 per cent, of the 78 patients in which the records mentioned the condition of the vessels. Had the patients been studied more carefully from this standpoint, with the aid of fluoroscopic examination of the aorta and roentgenograms of the vessels of the leg, the incidence of arteriosclerosis would certainly have been found to exceed this figure. Two out of twelve clinic cases examined, showing no clinical evidence of arteriosclerosis and not included in the above figure, showed definite x-ray evidence

*It was necessary to make this comparison with white standards, as no standards are available for the colored race.

TABLE 1-A, SUMMARY OF CLINIC CASES

Case Number	First Visit to Clinic	Age First Visit	Sex	Color	Height Without Shoes	Greatest Weight Dressed, lbs.	Greatest Per Ct. Overweight or Underweight		Weight Onset Treatment Dressed, lbs.	Weight Last Visit Dressed, lbs.	Duration Diabetes Before Treatment
1	4-20-27	58	Female	Black	5′1¾″	180	Plus	28.6	137½	142	4 years
2	6- 1-27	36	Male	Brown	5′9½″	163	Normal		152½	149	5 months
3	5- 4-27	36	Female	.....	5′1″	300	Plus	130.0	214½	215½	4 months
4	4-21-27	36	Female	Yellow	5′2¼″	170	Plus	30.8	123½	130½	Now
5	10-12-26	42	Female	Brown	5′2″	240	Plus	76.4	139¼	143¼	3 years
6	1-12-27	40	Female	Yellow	5′2¾″	175	Plus	29.6	145	147	1 month
7	2- 9-27	39	Male	Yellow	5′6″	214	Plus	38.0	177	181	1 year
8	7-20-27	31	Male	Brown	6′3¼″	205	Plus	17.1	158½	171	1 year
9	9-28-27	31	Male	Yellow	5′10¾″	150	Minus	11.8	138¼	133	6 weeks
10	5-18-27	40	Female	Black	5′0″	148	Plus	15.6	106½	119	3 years
11	9-21-27	50	Male	.....	5′7¼″	240	Plus	51.9	212	212¾	1 year
12	5- 4-27	44	Female	Brown	.....	200	.....		169½	167½	3 years
13	2-23-27	58	Female	Brown	5′1″	275	Plus	102.2	175	185¾	6 months
14	5-25-27	38	Female	Brown	5′2½″	139	Plus	3.0	126½	114¾	1 year
15	2-21-28	40	Female	Brown	5′2″	220	Plus	70.7	171	174½	2 months
16	10-20-26	26	Female	Brown	5′2½″	150	Plus	19.0	142	141¼	3¼ years
17	7-20-27	48	Female	Yellow	5′2½″	165	Plus	19.0	139¼	146¾	1 year
18	7-20-27	53	Female	Black	5′0″	145	.....		104	110¾	2¼ years
19	3- 8-27	52	Female	Black	5′5″	203	Plus	32.7	163	172	2 years
20	1-28-27	64	Female	Brown	5′4½″	248	Plus	64.2	129¾	147¼	11 years
21	2- 7-28	25	Female	Brown	5′1½″	174	Plus	40.3	139½	137½	1 month
22	10-19-27	48	Female	Yellow	5′9″	206	Plus	25.6	172¾	160½	?
23	4- 6-27	26	Female	Brown	5′3″	157	Plus	21.7	137	148	1 year
24	10-26-27	26	Male	Black	5′10″	160	Normal		142½	166½	Now
25	10-27-26	33	Female	.....	5′3″	180	Plus	40.6	130	.....	7 years
26	3-20-28	60	Female	Brown	5′5″	210	Plus	36.1	150	151	?
27	3-13-28	38	Male	Brown	5′8¼″	156	Minus	5.0	145¾	145¾	8 months
28	3-27-28	38	Female	Brown	5′1″	243	Plus	90.0	212¼	205¼	2 years
29	4-10-28	21	Male	Brown	5′11¾″	165	Normal		145	153	4 months
30	4-10-28	46	Female	Brown	5′6″	220	Plus	41.0	157	154½	3 years
31	4-10-28	53	Female	Brown	4′11″	167	Plus	22.7	123 5/8	127¾	3 years
32	4-24-28	38	Female	Black	5′1½″	175	Plus	32.6	167	167	Now
33	2- 9-27	52	Female	Brown	5′1″	273	Plus	96.4	223	184	3 years
34	5-29-28	48	Female	Yellow	4′9½″	128	Normal		83	94¾	6 months
35	5- 8-28	55	Male	Brown	5′9″	140	Minus	15.7	111	111	3 years
36	5- 8-28	42	Female	.....	5′1″	135	Plus	10.0	93¾	93¾	1 year

of arteriosclerosis of the arteries of the leg. *Table 3* shows the incidence by decade of arteriosclerosis in 43 cases. It will be noted that almost 10 per cent of the clinical arteriosclerosis occurs in individuals under 40 years of age. *Table 4* is an attempt to show the duration of the diabetes by decades in the 26 arteriosclerotic cases which could be included. Joslin considers in detail the great frequency of arteriosclerosis among white diabetics.

TABLE 3
INCIDENCE BY DECADES OF ARTERIOSCLEROSIS: 43 CASES

Decade	30-39	40-49	50-59	60-69	70-79
No. of cases	4	12	17	7	3

TABLE 4
DURATION OF DIABETES IN 26 CASES OF ARTERIOSCLEROSIS, ARRANGED ACCORDING TO DECADE

Duration, years		1	2	3	4	5	8	10	11	12	17
Decade	Total cases										
30-39	3	2	....	1	....	....	....	....	....	....	....
40-49	8	3	....	3	1	1	....	....	....	....	....
50-59	11	3	3	2	1	....	1	1	....	....	....
60-69	3	....	....	....	....	....	....	....	1	1	1
70-79	1	....	....	....	....	1	....	....	....	....	....

Hypertension.—Systolic readings of 150 millimeters of mercury, or greater, or diastolic readings of 90 millimeters, or greater, were arbitrarily selected as representing the hypertensive state. Among 81 patients, 36, or 44.4 per cent, showed evidence of hypertension. The hypertension occurred chiefly in the age groups in which it might be expected.

Complications, Coma.—There were 25 hospital admissions of patients in a state of impending or deep coma; 14 of these patients recovered and 11 died. One patient has had six hospital admissions for coma and is still living.

Gangrene.—There were 17 hospital admissions for gangrene, making an incidence of 15 per cent of the 113 hospital admissions. Eleven cases recovered, 9 of these without operation. Of 13 patients in whom the blood Wassermann was reported, it was positive in only one case. Lemann[1] found an incidence of gangrene of 21 per cent in 228 colored diabetics.

TABLE 1-B, SUMMARY OF CLINIC CASES

Case No.	Symptoms of Diabetes	Blood Wassermann	Blood Pressure	Arterio-Sclerosis	Fasting Blood Sugar	Insulin Units Daily	Visits to Clinic	Times Sugar Free	Complications and Remarks.
1	Yes	Negative	168/99	Plus	0.33	10	46	26	Cataracts; Iridectomy
2	Yes	Negative	90/75	0	0.20	20	38	18	Phimosis; Balanitis
3	Yes	Negative	150/85	Plus	0.24	0	2	2	Retinal arteriosclerosis
4	Yes	Negative	108/78	0	0.22	60-0	26	5	No insulin required after training in hosp.
5	Yes	Positive	100/80	Plus	0.25	0	24	12	
6	Yes	Negative	120/75	0	.....	20	25	12	Tests urine
7	Yes	Negative	140/100	Plus	0.29	10	4	4	Tests urine
8	Yes	Positive	.....	.....	0.40	15	10	2	Chancroid
9	Yes	Positive	90/60	0	0.29	0	4	0	Insulin edema
10	Yes	Positive	120/80	Plus	0.25	20	14	4	Hem. and exudate of retina; dead, acc'd't
11	Yes	Negative	245/110	Plus	0.18	0	4	1	Retinal arteriosclerosis; incip. cataracts
12	.....	Negative	138/70	0	0.19	0	3	0	Furunculosis
13	Yes	Negative	140/80	0	0.17	20	38	14	Cataracts; Neuritis
14	Yes	Negative	105/80	0	0.13	0	27	9	
15	Yes	Negative	140/70	0	0.13	10	18	5	Cataracts; Iridectomy
16	Yes	Negative	102/70	0	0.32	40	28	4	Osteomyelitis; operation
17	Yes	Negative	176/110	Plus	0.17	40	33	10	Tests urine; Retinal hemorrhages
18	Yes	Negative	168/96	Plus	.....	10	8	0	Retinal arteriosclerosis
19	Yes	Negative	180/90	Plus	0.18	20	45	29	Gangrene; amputation toes. Retinal exudate; cataracts
20	Yes	Negative	170/90	Plus	0.33	10	43	30	Cataracts; Iridectomy
21	Yes	Positive	118/74	0	0.13	0	15	10	Tests urine. Mother died of diabetes.
22	Yes	Negative	136/86	0	0.20	10	27	18	Tests urine.
23	Yes	Negative	.....	0	.....	20	29	5	Miscarriage
24	Yes	Negative	100/72	0	0.33	10	9	3	Tests urine. Balanitis
25	.....	Positive	120/78	0	0.33	20	....	....	Wassermann neg. after treatm't; neuritis
26	Yes	Negative	170/90	Plus	0.15	0	4	1	Cataracts; Iridectomy
27	Yes	Negative	120/65	0	0.18	0	1	0	Operation strangulated hernia
28	Yes	Negative	154/98	0	0.33	0	4	0	
29	Yes	Negative	100/60	0	0.22	10	20	18	T.B. left-fan infiltration. Slight insulin edema
30	Yes	Negative	150/90	Plus	0.22	0	3	1	
31	Yes	Negative	158/86	0	0.15	0	15	15	Cataracts; operation
32	No	Negative	130/82	0	0.15	0	1	0	Fibroid uterus
33	Yes	Positive	144/80	0	0.22	0	3	3	Infected hand. Wassermann negative after treatment.
34	Yes	Negative	162/84	Plus	.....	10	9	0	
35	Yes	Negative	105/75	Plus	.....	0	1	0	Cataracts; neuritis; tuberculosis. Died.
36	Yes	Negative	138/78	Plus	0.25	0	2	0	

Cataract.—The occurrence of cataract was noted in 16 cases. With more careful eye examinations, the incidence would certainly have been found to be higher, as 9 of these cases were found among the 36 clinic patients. Three of the 16 cases of cataract occurred in males. Retinitis and other retinal changes were found frequently.

Tuberculosis.—Extensive active tuberculosis was present in two patients, clinic cases Nos. 21 and 35. In the former the process was chiefly unilateral with beginning cavitation and positive sputum. Artificial pneumothorax is being employed by Champneys Holmes in *Case 21* in the hope that it will yield as striking results as it has in a young adult white diabetic who had a positive sputum and a cavity in the right base. *Case 35* died in the hospital; autopsy revealed extensive honey-comb cavities, particularly in the bases of both lungs. Routine x-ray examinations of the lungs of 10 additional clinic cases showed no definite evidence of tuberculosis.

Many other complicating disease conditions were present in the series. It is interesting that no carbuncle was encountered.

Deaths.—Clinic *Case 10* was killed in an accident and *Case 35* died of tuberculosis; so far as can be ascertained, the others are still living.

Among the hospital admissions, there were 27 deaths, 17 females and 10 males, due to the causes listed in *Table 5*. Many of these patients were moribund when admitted to the hospital, death occurring within the first twenty-four hours. This accounts for the incomplete hospital records in most instances.

General Considerations, Clinic Cases.—Diabetes in the negro presents many special problems, particulary in the efforts aimed at adequate treatment. The Southern negro is accustomed to a diet of bread, hominy grits and other foods of high carbohydrate content, fat meats and vegetables prepared with fat. A

TABLE 5

CAUSE OF DEATH—27 CASES

Disease	No. of Cases
Coma	8
Coma and diarrhea	1
Coma and pneumonia	2
Pneumonia	2
Pelvic abscess	1
Gangrene	5
Meningitis and sinusitis	1
Toxemia pregnancy	1
Antritis	1
Tetanus and gangrene	1
Apoplexy	2
Gangrene and operation	1
Tuberculosis	1

diet must be arranged so as to be acceptable to his taste. Fresh vegetables, fruits and butter fat are expensive and for economic reasons cannot form a large part of the dietary. Moreover, many patients, although anxious to cooperate, have not sufficient intelligence to follow simple printed instructions.

The most striking example of this fact is found in clinic *Case 4*. This patient did not become sugar-free while taking 60 units of insulin daily, but when admitted to the hospital she became sugar-free on the same diet formula without insulin. Furthermore, she was able to remain sugar-free without insulin after discharge from the hospital as a result of training in diet.

This gives striking proof of the importance of painstaking instruction in a special diet kitchen.

Considering the difficulties mentioned, the ambulant patients cooperate very well and many of them take a great deal of pride in their efforts and their ability to remain sugar-free. Several patients test their own urine specimens, study Joslin's *Diabetic Manual*, and discuss dietetics more or less intelligently.

Table 1 shows the number of clinic visits of each patient and the number of times that the 24-hour urine specimens were sugar-free. In reviewing these figures, it must be remembered that in some instances many visits were made before the patient was able to grasp the diet instructions or the proper dose of insulin was determined.

Insulin.—Among the clinic cases, 19 received insulin. With the one exception of a cataract patient who comes to the clinic daily for her injection, all of these patients administer the insulin to themselves or receive it from a member of their family. Necessary sterile precautions are observed, and there has been no case of local infection. The insulin dosages employed show that the diabetes is usually mild. If the diets were not broken frequently, the dosage could be even smaller.

Insulin Reactions.—The usual types of insulin reactions have been noted in the hospital and clinic cases.

In addition, a hemiparesis of three days' duration, followed by complete recovery, occurred in a male 30 years old. Repeated doses of adrenalin and glucose raised the blood sugar level without producing any immediate effect upon the paralysis. Injections of pituitary extract were also employed without effect upon the symptoms. This case was studied by William A. Smith, visiting neurologist. The clinical picture was the same as that seen in the rarer type of severe insulin reaction, described by Miller and Trescher[8] and Ravid.

An interesting observation was made in clinic *Case 10*. While awaiting her turn at the clinic, she complained of extreme hunger and weakness. Questioning revealed the facts that through error she had administered to herself twice the amount of her usual dose of insulin and had not eaten breakfast. Her blood was taken and a simultaneous specimen of urine was collected. Although the urine reduced Benedict's solution, 20 c. c. of 50 per cent glucose solution was given intravenously, resulting in the immediate disappearance of symptoms. The blood filtrate gave a reading of 0.057 per cent sugar; a portion of the same filtrate was checked in a second laboratory. The simultaneous urine, volume 112 c. c., contained 0.2 per cent glucose. This patient was a true diabetic and was known to have a high renal threshold.

This observation demonstrated that it is possible for the bladder urine of the diabetic to contain sugar at the same time that the blood sugar has fallen to the hypoglycemic level. In most instances, a sugar-free urine is confirmatory evidence of an insulin reaction accompanied by hypoglycemia; in the above observation it was not. As a result of the marked insulin overdosage, the hypoglycemia had developed so rapidly that the patient had not voided the bladder urine which had accumulated during the hyperglycemic period.

No metabolism studies have been performed upon these patients. Such studies will be made, because one is constantly impressed by the fact that the obese cases do not lose weight, even though they claim that they adhere to a diet yielding a very small caloric value; in some instances the food which the patient claims to be taking regularly could yield only 900 to 1,000 calories daily, as calculated from the diet lists submitted.

Practically all of the clinic cases have been able to continue with, or resume, their usual occupations. Thus the results obtained, although far from being ideal, when viewed from

the economic standpoint justify the effort expended.

SUMMARY

The data from one hundred cases of diabetes mellitus occurring in the colored race has been subjected to statistical analysis. The disease occurs in pure black negroes as well as mulattoes. The sex incidence in this series is predominantly female. In the large majority of cases the appearance of the disease has been preceded by marked obesity in the female patients. Syphilis has not seemed to be an important etiological agent. The disease is usually mild and the greatest handicap to adequate control is poor cooperation, due to poverty and lack of intelligence. The same complications appear in the negro and white diabetic. Successful results can be obtained in colored patients after painstaking instruction in the general principles of diet, insulin dosage and administration of insulin and the technic of testing urine for sugar.

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TREATMENT OF CHRONIC PROSTATITIS BY INJECTION*

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The unsatisfactory and prolonged treatment of chronic prostatitis has so long been a bugbear to urologists that the proposed remedies and palliatives are legion in number and the vast army is arrayed in echelon: first, the reconnaissance scouts of orally administered sedatives, then the light cavalry of vaccines, then the machine guns of massage, followed by the infantry with fixed bayonets of vasopuncture, and in dire need supported by the heavy artillery of prostatectomy. I am sure it is needless, as well as painful, to recall to all of you the distress and difficulties that have followed the use of each rank and file in your hands. Sometimes the patients miraculously get well and more often they continue to crowd your reception rooms for a more extended period than their welcome warrants.

Most chronic prostatitis is a camp follower of gonorrhea and makes its appearance late or after all manifestation of the urethral distress has passed. The bacteriology of these cases as worked out by J. H. Hill shows the *Staphylococcus albus* and the colon bacillus in marked predominance and the gonococcus itself very scant, similar to the findings in pyosalpinx of the female.

The tissue condition is varied according to the stage of the disease from an acinous involvement of mild type to a periglandular fibrosis of extreme degree. All stages, however, are marked by the characteristics of infection.

The symptoms are typified chiefly by

Pain in the sacrum.
Pain in the perineum.
Pain in the suprapubic region and groin.
Morning discharge.
Burning on urination.
Sexual disorders.

Many of the symptoms of prostatitis, however, are very remote from the urological tract and the seat of the lesions is discovered only by a complete physical examination which includes expression of the prostatic secretion. In this connection we have found that many cases of suspected prostatitis, referred to us by the general medical men, presented no pus in the massaged secretion at first, but after two or three treatments with rectal diathermy, pus began to discharge in considerable quantities, and the distant symptoms of arthritis and neuritis cleared up. We have been most particular in these cases to pass no instruments per urethram or give any urethral irrigations prior to or during the diathermy treatments.

The use of mercurochrome intravenously, and through the vas following vasopucture, suggested to us the possibility of applying it more accurately by introducing it directly into the gland.

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We felt that even where the ejaculatory ducts could be satisfactorily catheterized, injection by this method would fail to reach sufficient of the acini to be remedial.

The cases chosen were those of comparatively long standing with a firm or boggy prostate, never abscess formation. In addition great care was taken to exclude any case presenting gonococci in the urethral discharge, organic stricture of any caliber in the urethra, peri-urethral abscess, epididymitis, or infection anywhere else in the urinary tract.

With this careful exclusion we have injected one hundred cases of simple uncomplicated chronic prostatitis with the following technic and results.

After thorough irrigation of the bladder, leaving it distended, the massaged secretion of the prostate showed in every case from thirty to several hundred pus cells to the 1/6 objective field of the microscope. We began these injections on hospital patients, watching carefully for any reactions in those we kept under constant observation, and then as experience proved a freedom from these we have continued on ambulatory patients.

Our technic has been as follows:

The bladder is filled with the patient in the lithotomy position. A wheal is made about 3 cm. above the anus and then a deeper injection of 1 per cent novocain. The gloved finger of the left hand is introduced into the rectum.

A 4-inch needle of 22 gauge, preferably attached to a Luer Loktite syringe, is introduced at the wheal and guided through the perineal structures until its tip can be felt at one lobe of the base of the prostate lateral to the raphe.

The needle is pushed through the prostatic capsule, at which time a definite sense of resistance presented by this tissue is felt.

Three c. c. of freshly prepared 1 per cent mercurochrome are injected, moving the needle about in the gland to distribute this as much as possible. The needle is then inserted to the other side of the prostatic raphe and a similar injection made.

On the introduction of the fluid the patient always feels a sensation of fullness in the gland and it requires moderately firm thumb pressure to force the fluid in. The needle is then withdrawn and the prostate massaged gently by the finger in the rectum.

Very little discomfort accompanies the injection and this is relieved immediately when the patient voids. The voided urine or distending fluid is well colored with mercurochrome and a definite trace of this is seen frequently in the urine for three days and in the massaged secretion for as long as two weeks.

Two considerations led us to proceed cautiously with this injection at first. One, the possibility of extra-prostatic injection and its effect on tissue. In our hundred cases no untoward result occurred in this respect, though I know personally that on one occasion I injected 3 c. c. of the fluid outside the prostatic cavity into the perineal tissue. The other consideration was whether mercurochrome would cause a necrosis of prostatic tissue. For this reason we have injected always small amounts and so far have had no untoward results, though, fortunately, none of these cases has come to autopsy for this or other reasons to permit us to examine the prostate pathologically.

RESULTS

The immediate and end-results have been most gratifying to us. The patients have reported twice a week for as long a period of observation as we deemed necessary. In several cases we have repeated the injection. The patients have in all cases experienced promptly a subsidence in their symptoms, and in practically all cases the number of pus cells has very markedly diminished in two weeks' time, many of them disappearing altogether.

In conjunction with these injections we use massage and diathermy. Our purpose in presenting this method is not to assure a cure all, but we believe it a valuable adjunct in reducing the period of treatment in obstinate cases. We do not advise its use in acute prostatitis, as we have had no experience with that type of case. We have used it twice in prostatic abscess where we evacuated the pus through the needle and then injected the mercurochrome. With our experience, even in this comparatively limited number of cases, we feel quite free from any apprehension of untoward effect if it is properly used.

DISCUSSION (*Abstract*)

Dr. C. E. Burford, St. Louis, Mo.—I am greatly interested in Dr. Grant's statement that some first examinations showed no pus cells in the secretion from the prostate, but that subsequent examination showed a free flow of pus in the secretion. I have had the same experience, but have been ashamed to say that I found pus after a few manipulations, feeling that I possibly was the cause of the pus that I did not find at the

first examination. Whether it is a reaction that brings the flow of the leucocytes later, or whether it is a focus that we were unable to find the first time I do not know, but I am inclined to think it is a reaction.

The method described is unique to me, but with our knowledge of the action of mercurochrome in tissues in general we should not be afraid to use that amount. I am convinced that the good we do with any manipulation of the prostate comes as the result of the reaction and not as a result of mechanical emptying of secretion. I doubt that the antiseptic effect of the mercurochrome is so important as the reaction it produces. This method of treating chronic prostatitis promises help in a lame department and should be given a thorough trial.

Dr. William A. Frontz, Baltimore, Md.—Just one point in connection with the observation of Dr. Burford, that the first examination of the prostatic secretion may give comparatively normal elements, whereas on subsequent examinations pus is found. I think his is a rather common observation and believe most urologists have had this experience. I have explained it not on the ground of a tissue reaction, but on a somewhat more successful evacuation of all parts of the gland which were not emptied by the first massage. I think therein lies one of the advantages of massage.

Dr. Claude G. Hoffman, Louisville, Ky.—Dr. Terry Townsend, of New York, introduced this method several years ago. It was not original with him, but was brought to him from South America. I saw with him several of these cases and was able to observe his technic. His medicament was normal horse serum and phenol. The ten cases in which I used this method of treatment with very good results were all acute ones. Dr. Grant prefers not to use the method in the chronic. We filled the prostatic capsule as full as we thought possible, and some took 15 c. c. on either side. The reaction was very severe at times. This treatment was alternated with intravenous injections of methylene blue and phenol.

Dr. Grant has brought out the use of mercurochrome and that is probably better in chronic cases. In my series I can recall only three cases of the chronic type in which perfect results were obtained.

Dr. George B. Lake, Chicago, Ill.—If one will take the trouble to count the leucocytes before and after a number of these procedures, it will be found that many of the medicaments which contain the salts of heavy metals will cause a prompt rise in the white cell count. Possibly, mercurochrome and various other drugs which we use intravenously perform their function and produce the results we wish because they increase the leucocytes in the body.

Dr. Grant (closing).—I feel that we are treading on a little new ground in this thing, and I have not gone at it nearly so vigorously as we hope to as time goes on. We have thought it affected considerably the length of treatment in the chronic cases.

As to the amount of mercurochrome and its strength, at one time my assistant made a mistake and found he had injected a 4 per cent solution instead of the 1 per cent, but this caused no particular difference in the patient's reaction.

I do not believe it wise to distend the capsule fully. The thing that will be accomplished by that will perhaps be more dangerous than the condition we are treating, and the possible good results will not offset the danger. We selected mercurochrome because of its permeability, and it has remained in the prostatic secretion as long as two weeks. I fail to see how it can promote a leucocytosis, although I have not counted the leucocytes in the blood before or following its use.

PROGRESS REPORT ON AN INVESTIGATION IN RACE PATHOLOGY*†‡

By RAYMOND PEARL,
Baltimore, Md.

In 1923, a grant from the National Research Council made it possible to undertake the considerable task of editing, abstracting and transferring to statistical card forms the protocols of the first 7,500 autopsies made in the Johns Hopkins Hospital, to serve as the basic material for a comprehensive, analytical investigation of the comparative pathology of the colored and the white races.

The preparation of the cards was completed in two years. They embody a material unique in character for the study of racial pathology. The comprehensiveness and accuracy of the original pathological records of the Johns Hopkins Hospital have never been surpassed, and rarely equaled by the similar records of any other hospital.

The extent and scope of the material is indicated in *Table 1.*

Following the completion of the cards, the analytical study of the problem was promptly begun. It has proceeded more slowly than was originally expected because of the fact that further grants to facilitate this part of the work were not forthcoming, and there were no funds of either this Institute or of the Johns Hopkins Hospital which could be specially devoted to this work.

Up to the date of this report six papers have been published (or are now in press) regarding this work. Their titles, and a brief summary of the results detailed in each, follow:

I. Biometrical Studies in Pathology. IV. Statistical Characteristics of a Population Composed of Necropsied Persons. By Raymond Pearl and Agnes Latimer Bacon. (*Archives of Pathology and Laboratory Medicine*, Vol. 1, pp. 329-347, 1926.)

In this paper is presented a detailed account of the

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*Prepared and published at the request of the Division of Anthropology and Psychology of the National Research Council, under whose auspices the work has been done.

†Received for publication October 11, 1928.

‡From the Institute for Biological Research, Johns Hopkins University.

TABLE 1
NUMBER OF CASES BY DATE, SEX AND COLOR

Necropsy No.	Date of First Autopsy in Group	Date of Last Autopsy in Group	Number of Cases							
			White Males		White Females		Col. Males		Col. Females	
			Absolute	Percentage of Total	Absolute	Percentage of Total	Absolute	Percentage of Total	Absolute	Percentage of Total
1- 999	May 28, 1889	Sept. 21, 1897	426	43.6	213	21.8	205	21.0	134	13.7
1000-1999	Sept. 27, 1897	Sept. 22, 1902	369	38.2	181	18.7	250	25.9	166	17.2
2000-2999	Sept. 26, 1902	Jan. 21, 1908	364	39.7	143	15.6	254	27.7	157	17.1
3000-3999	Jan. 22, 1908	Sept. 21, 1913	367	38.6	181	19.0	246	25.9	157	16.5
4000-4999	Sept. 24, 1913	Jan. 20, 1917	339	38.9	169	19.4	215	24.7	149	17.1
5000-5999	Jan. 20, 1917	Sept. 9, 1919	273	34.1	189	23.6	193	24.1	145	18.1
6000-6999	Sept. 10, 1919	May 8, 1922	276	35.6	172	22.2	206	26.5	122	15.7
7000-7499	May 8, 1922	May 22, 1923	177	43.3	72	17.6	81	19.8	79	19.3
Totals			2591	38.8	1320	19.8	1650	24.7	1109	16.6

Subtotal on color..... Total whites = 3,911 = 58.6%. Total colored = 2,759 = 41.4%.
Subtotal on sex..... Total males = 4,241 = 63.6%. Total females = 2,429 = 36.4%.

biometrical characteristics of the age, sex and racial distribution of persons included in the autopsy records of the Johns Hopkins Hospital numbered from 1 to 7,499. A detailed discussion is given of the manner in which the distributions differ among themselves, and from those of the general population from which these autopsy subjects mainly come (partly shown in *Table 1* above). The data presented afford the requisite statistical basis for special biometric studies of particular pathologic conditions.

II. Biometrical Studies in Pathology. V. The Racial and Age Incidence of Cancer and Other Malignant Tumors. By Raymond Pearl and Agnes Latimer Bacon. (*Archives of Pathology and Laboratory Medicine*, Vol. 3, pp. 963-992, 1927.)

It was decided to undertake, as the first step in the more detailed analysis of this collection of autopsy records, a thorough biometric study of the cases of malignant tumors of all sorts (carcinomas, sarcomas and other malignant tumors) which have occurred in this autopsied population. The present paper begins a series which will deal with this subject. In it is discussed the frequency of malignant tumors in this autopsied population, with special reference to race and to age. This will be followed in later papers by detailed treatment of such matters as location and type of tumors and relation to other lesions.

It is well to emphasize that the original, first-hand material here presented comes from the autopsy experience of one hospital only. This means that it cannot be regarded as a random sample of human beings in general. It must be discussed from somewhat the same point of view that, for example, a unique specimen of fossil man has to be.

The outstanding merit of the basic material is its fundamental accuracy. In the data about malignant tumors in this paper there inheres a kind of certainty which can never be achieved from the official mortality statistics of a general population. Every single figure in our original tables rests on a careful, thorough autopsy made by a trained and expert pathologist. The contrast, in respect of accuracy, between such data about cancer, and the diagnoses of the general practitioner which are recorded on official death certificates, is great. The advantages of the present material in this respect go a long way toward offsetting its deficiencies in other statistical respects.

The following results seem to be established with a high degree of probability by the data presented:

(1) In a total of 6,670 autopsies some form of malignant tumor was found in 12.2 per cent of the cases. Such tumors do not appear from official vital statistics to occur so frequently as this in the general population.

(2) In this autopsied population carcinoma occurred much more frequently than did malignant tumors which were not carcinomata. This material agrees with other hospital and autopsy data in indicating that from 22 to 25 per cent of cases of malignancy, taken at random, will be non-carcinomatous in character.

(3) In this autopsied population malignant tumors of all sorts taken together occur from two to three times more frequently relatively among white persons than they do among colored persons. This racial difference is much more marked relatively for malignant tumors which are not carcinomatous (i. e., in the sarcoma and other groups) than it is for the carcinomata. A careful critical examination of the most trustworthy available statistical data for general populations leads us to conclude that,

in general, malignant new growths occur with considerably greater frequency in the white race than in the colored in the United States. All lines of evidence concur in support of this conclusion: autopsy records, age corrected death rates for general populations, and death ratios specific for age and sex. The only apparently significant exception to this general conclusion is found in the fact that, during the child-bearing ages, colored females exhibit a higher incidence of malignancy than do white females. The generally less frequent occurrence of malignant neoplasms in the negro may indicate a lower susceptibility of truly genetic, racial origin, reflecting a real biologic differentiation of colored from white in this respect. But one should be cautious about drawing such a conclusion on the basis solely of the evidence now available.

(4) Malignant tumors of all kinds, taken in the aggregate, tend to occur a little more frequently, relatively, among females than they do among males in this autopsied population, but this tendency is small in magnitude and disappears entirely in the sarcoma group.

(5) In this autopsied population, in both the carcinoma and sarcoma groups, the distributions of the individuals in respect of age at death are symmetrical about their mean points, within the margin of error reasonably to be expected from random sampling.

(6) In this autopsied population persons having carcinoma die at a much higher average age than those having sarcoma (or other non-carcinomatous malignant tumor). This difference is of the order of 16 to 20 years, the carcinoma deaths generally occurring at an average age around 50 to 55. But there is, in all groups, a higher degree of variability in age at death from malignancy.

(7) The colored persons in this autopsied population who die with malignant tumors tend to do so at an earlier age on the average than do whites. The only exception is in the case of the female sarcomatous groups.

(8) Cancerous females, so far as may be judged from this autopsied population, tend to die at an earlier age, on the average, than do cancerous males.

(9) The relationships of the races and sexes in respect of age at death from malignant tumors stated in the two preceding paragraphs are also true of the general population of the Registration States, as judged from official vital statistics.

(10) The crude death rate of the necropsied population, taking all ages and all causes together, is 30.98 per thousand person-years exposure to risk as against 19.42 for the general population in 1910. The reason for the excess is discussed in the original paper.

(11) Actuarial treatment of the data from this autopsied population leads to the general conclusion that the form of life curve for such a population is substantially similar to that of the life curve for a general population, though its absolute position in space is different. The life curves for the persons in this autopsied population dying with malignant tumors are characteristically different from the "all causes" curves.

III. Biometrical Studies in Pathology. VI. The Primary Site of Cancers and Other Malignant Tumors. By Raymond Pearl and Agnes Latimer Bacon. (*Archives of Pathology and Laboratory Medicine*, Vol. 6, pp. 67-89, 1928.)

In this paper there are first presented detailed tabulations showing the site of the primary tumor in the 816 cases of malignant neoplasms included in that part of the autopsy experience of the Johns Hopkins Hospital dealt with in this series of studies.

These data indicate that:

(1) In males carcinomata occur most often in the alimentary tract and its associated glandular organs, and in females in the reproductive system (primary and secondary sex organs).

(2) Sarcoma and other non-carcinomatous malignant neoplasms do not exhibit any corresponding concentration of organological location.

(3) Only one case of multiple primary malignant growths occurred in these 816 autopsies.

(4) In this autopsy experience there is statistically a greater concentration of carcinoma cases with the cancer at the modal or most favored site in the colored than in the white race, both in general and for cancer of the alimentary tract and the female reproductive organs separately.

(5) The proportion of cases showing no secondary or metastatic tumors is somewhat higher in the colored than in the white group in this experience, the percentage being 33 for colored males against 29 for white males, and 38 per cent for colored females against 33 for white females. The samples are small, however, and the differences cannot be regarded as statistically significant.

(6) In those cases where secondary or metastatic tumors do occur the mean number of

such separate tumors is somewhat higher in the colored than in the white race in this experience.

(7) The results set forth in paragraphs 4, 5 and 6, together with the evidence presented in the preceding paper in this series (*loc. cit.*) suggest that there is a constitutional difference between the white and the negro races in relation to malignant disease which manifests itself both in relative incidence and in the biological and clinical characteristics of malignancy when present.

(8) The mean age at death of persons showing metastatic tumors at autopsy is from 1 to 3 years lower than it is in persons without such secondary growths in this experience.

IV. New Data on Alcohol and Duration of Life. By Raymond Pearl and Agnes Latimer Bacon. (*Nature*, Vol. 121, pp. 15-16, 1928.)

From the data presented in this paper the following points are to be noted.

(1) As compared with a general population, the part of an autopsied population here discussed is, as a whole, inferior in mean duration of life. This has been shown in an earlier paper (*loc. cit.*) to be true of the Johns Hopkins Hospital autopsies as a whole. In this respect, and also in the respect that mean age at death of the females is lower, generally speaking, than that of the males (instead of higher as in the general population) the part of the autopsy material here dealt with appears to be a fair sample of the total autopsied population from which it is drawn. In other words, the cases for which information is available as to alcoholic habits appear not to be sensibly differentiated in other respects from the rest of the autopsied group.

(2) The colored persons in this experience have lower mean ages at death than the corresponding groups of white persons. Again the result is in agreement with the autopsy experience as a whole, as previously reported, and with the general population figures. The negro seems always to be a poorer life risk than the white, under American urban conditions.

(3) There is no significant difference between abstainers and moderate drinkers in respect of mean age at death in any of the four groups. In two groups (male white and female colored) the mean for the abstainers is slightly higher than that for the moderate drinkers, while in the other two groups the opposite condition appears. With the exception of the male colored group, the mean age at death of the heavy drinkers is lower than that for either abstainers or moderate drinkers.

(4) What the present material shows, in short, is that, in the first 34 years of operation of the Johns Hopkins Hospital, all of those patients in its experience over twenty years of age who came to autopsy and were known to have been moderate drinkers (as defined in *Alcohol and Longevity*) died at approximately the same average age as did all of those patients over twenty years of age who came to autopsy and were known to have been total abstainers. Thus material from a totally different source, collected by entirely different persons with no possible thought of its use in the present connection, representing a different portion of the general population, and of a high degree of critical accuracy, essentially confirms the main conclusion of the former study embodied in *Alcohol and Longevity*. This autopsy material gives no evidence that moderate drinking shortens life.

V. Cancer from the Viewpoint of the Human Biologist. By Raymond Pearl. *International Clinics*, Vol. —, pp. —, 1928.

This paper, which constituted one of the eleventh series of Harrington Lectures at the University of Buffalo, School of Medicine, summarizes and discusses the data of papers I, II, III and IV of the present Report.

VI. Cancer and Tuberculosis. By Raymond Pearl. *American Journal of Hygiene* (in press).

In this study there was first set up, by a critically adequate procedure, a case-for-case control series of autopsied patients, each one of whom was of the same sex, age and color (race) as one of the 816 persons autopsied in the Johns Hopkins Hospital and found to have carcinoma, sarcoma, or some other form of malignant tumor. The individuals in the control series did not have cancer or any other malignant tumor. With these malignant and non-malignant series of cases it was then shown that:

(1) Active tuberculous lesions were found at autopsy in only 6.6 per cent of 816 persons having malignant growths. On the other hand, such tuberculous lesions were found in 16.3 per cent of 816 persons without malignant tumors, but of the same race, sex, and age as the former group. Active tuberculous lesions, therefore, occurred over twice as frequently in the controls as they did in the malignant group in the present material taken as a whole.

(2) Active tuberculous lesions occur 2.2 times more frequently among the controls of the carcinomatous than among those having carcinoma; whereas, such active tuberculous lesions occur 3.3 times more frequently among the controls

of the sarcomatous than among those having sarcoma.

(3) Healed tuberculous lesions (apical scars, calcified tubercles in glands) occur with equal frequency in the malignancy and control groups, whether they are taken as wholes or when carcinoma and sarcoma (and other) are separately treated.

(4) In each decade of age, and in each sex and race division of the material, the percentage of persons showing active tuberculous lesions at autopsy is markedly higher in the control group than in the malignancy group.

(5) Looking at the matter from the reverse aspect, it was found that, in this autopsy experience, persons who had tuberculous lesions of any degree of activity whatever showed a relative incidence of cancer and other malignant tumors, only a little more than half as great as that exhibited either by persons with no tuberculosis discoverable at autopsy, or by those who have only old, healed tuberculous lesions.

(6) In each decade of age, over the whole life span, cancer or other malignant tumors occur less frequently in those with active tuberculosis than in either the non-tuberculous or those with old healed lesions.

(7) In 886 persons of both sexes and races compared, who had a great deal of florid, active tuberculosis (such as acute, ulcerative tuberculosis of the lungs or intestines, tuberculous meningitis, caries of the vertebrae) there were but 11 cases of malignant tumors, or 1.2 per cent of the total number. On the other hand, in 886 persons with no recorded lesions of tuberculosis at autopsy, having the same age, sex and racial distribution, case for case, as the very active tuberculous, there were 82 cases of malignant tumors, or 9.3 per cent. Among the females, both white and colored, there was not a single case of malignant growth in those with much active tuberculosis. This general result is confirmed in each separate age, sex and color group, save for a few cases where the numbers are too small to give any reliable indications whatever.

(8) There is no significant difference in this material between groups of persons with cancer or other malignant tumors, and groups of persons without any malignant neoplasm, in respect of the incidence of either pleural adhesions or emphysema, all of the persons in both groups having no lesions of tuberculosis.

(9) Five general classes of facts derived from official mortality statistics from the general population are in agreement, in principle, with the conclusions reached above from autopsy material. The same is true of the results of a study of the correlation of age specific death rates in connection with this problem.

(10) In general, it must be concluded that there is a definite and marked incompatibility or antagonism between the two diseases, cancer and tuberculosis, of such sort that both occur together at the same time in florid activity in the same individual only with great rarity.

FUTURE WORK

It is proposed to continue the studies in racial pathology with this material. The work so far done suggests interesting and, it is believed, important differences between negroes and whites in relation to cancer. This line of investigation is being developed in further detail at the present time.

It is hoped that funds, to the relatively small amount necessary, may be found to make possible the abstracting and putting on cards of the autopsy protocols of the Johns Hopkins Hospital from No. 7,500 up to No. 10,000. The value of the whole material would be greatly enhanced if this could be done. Inasmuch as the Committee on Human Migration of the National Research Council, in connection with which this work was started, has now been dissolved, it becomes necessary to seek the necessary funds from other sources. Any suggestions to this end from the readers of this Report will be greatly appreciated.

FATTY TUMORS OF THE INGUINAL CANAL AND SCROTUM RESEMBLING RECURRENT HERNIA*

By I. M. Hay, M.D.,
Melbourne, Fla.

Solid masses of fat are not commonly found in the scrotum. On account of their apparent origin from the testes in early times they were known by the term "steatocele." Cecil, in a review of cases reported, doubts that any are true lipoma testes. He states that it is quite difficult to determine the origin of the tumor.

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It is confusing to decide whether one is dealing with a lipoma arising from the tissues of the cord, or with a fatty tumor of the inguinal canal which has taken origin from the pre-peritoneal fat and has descended into the scrotum. The latter type is more common. These tumors are usually seen in middle and advanced age, being rare in children and adolescents. Wilms reported an instance in which the tumor weighed twenty pounds.

True lipomata of the spermatic funiculus originate from fatty lobules within the tunica vaginalis communis of the cord. Hutchinson, in a microscopic examination of 22 dissections, found fatty lobules in 11 instances. Schiller states that microscopic fat can be demonstrated in every cord. The differential diagnosis between lipoma of the cord and the more common lipoma of the pre-peritoneal tissue is not difficult in the early stages. One should find the former enclosed by the tunica vaginalis communis deriving its blood supply from the vessels of the cord, the latter outside the tunica vaginalis communis, deriving its blood supply from the subperitoneal fatty tissue. However, as Schiller points out, lipomata of the spermatic cord break through the tunica vaginalis as they increase in size, and also extend upward into the inguinal canal to assume a close relationship with the pre-peritoneal fat. His paper is concluded with a report of an instance of undoubted lipoma of the cord.

Several cases of lipomata of the testicle have been reported. The case reported by Roeder in which a small nodule of fat was found beneath the tunica vaginalis viscerum is apparently an example of true lipoma of the testes. Roeder reviewed eight other reported cases, but believes that only two of them were proven lipoma of the testicle.

Fatty masses associated with hernia are frequently found at operation. Speed, in 154 herniotomies, found lipomata present in the opened canal in 73 instances, or 47.4 per cent. These may be classified into three general types, all apparently arising from the pre-peritoneal fatty tissue: (1) long pedunculated masses slightly lobulated and covered with a more or less true peritoneal-like covering which looks like a very thin sac, taking their blood supply from above; (2) broad, bulging masses originating behind the cord at the internal ring and bulging out in the general direction of the cord, lying posterior to it, or (3) distinct fatty masses incorporated in the tissues of the cord with an attenuated neck at the internal ring. Speed stresses the importance of complete dissection of the sac and removal of all fatty masses found associated.

Embryologically, it is apparent that the origin of these lipomata is from the pre-peritoneal fat either directly or from fat which has descended into the cord at the time of the descent of the testicle. The differential diagnosis of these tumors should present no especial difficulty if one is on the lookout for the condition. In cases where there is a concomitant hernia or sac associated, variations in the findings will, of course, be encountered. The salient point is that we are much more likely to overlook lipomata in this location than to diagnose them erroneously.

Case 1.—(Courtesy Dr. Chas. Jennings.) January 6, 1925, J. R., a man 27 years old, was operated upon for hernia of the right inguinal type. One year after operation he noticed a small lump under the scar of the previous operation. This lump was about the size of the end of a finger, did not disappear on lying down, and was freely movable. He was told that he probably had a return of the rupture. The tumor gradually increased in size and is now as large as a fist.

Physical examination generally was negative except for the finding of a mass in the right inguinal region the size of a small grapefruit, soft and doughy in feel. There was no tenderness, it did not pulsate on coughing, could not be reduced, and was freely movable. A diagnosis of omental hernia was made and operation advised.

On opening the deep fascia a well encapsulated mass of fat resembling omentum was found. As the capsule or sac was traced, a small fibrous band was seen to extend up to the internal ring. This fibrous band did not have an opening into the peritoneum. The band was ligated and buried beneath the aponeurosis of the external oblique. The gross examination of the tumor resembled closely a fatty tumor. At present (May 17, 1928) the patient has had no further trouble and is working daily.

Case 2.—F. D., aged 33, stated that he had a recurrent inguinal hernia and wanted it re-operated. Herniotomy was performed about ten years before when he was in the army. He had no sypmtoms following this repair until 1925, when he noticed a small nodule in the right inguinal region under the old scar. The tumor became progressively larger, never decreasing in size nor showing any sudden enlargement. He sought advice and was told that he had a recurrent hernia. Efforts were made to reduce the mass with the aid of starvation and anesthesia.

Physical examination disclosed an obese white male of 33 in apparent good general health. In the right scrotum a mass as large as grapefruit was noted, freely movable under the skin and fascia. The cord and testicle could not be made out as separate from the bulk of the tumor. Above, it was continued by a constricted neck into the inguinal canal. No impulse was transmitted to it on coughing. Light was not transmitted. A scar from a previous herniotomy was present.

At operation a fatty mass was readily delivered out of the scrotum. The testes and cord were dissected free with considerable difficulty. The usual coverings of the cord could not be demonstrated, probably due to the previous herniotomy. Above, the mass was attached by a constricted pedicle in the internal ring. This was dissected free from the vas and cut. The hernial repair was apparently competent and no sac of any type could be found.

The medico-legal aspect of these cases is of interest, as they are usually reported as recurrent herniae. In the first case, insurance was obtained which provided compensation for illness, but exempted the company from payment for disability due to hernia. The patient informs me he was able to collect the full disability compensation in this instance. In the latter case the question of liability came up, as the patient was a lineman for the Southern Bell Telephone Company.

The treatment is surgical. One should attempt to preserve the vas and testes if it is possible to maintain sufficient blood supply. In many instances this will be found impossible, especially in those tumors arising from the elements of the cord itself. If there has been no preceding herniotomy a radical repair should be performed, as the tumors usually dilate the inguinal canal. If a previous repair has been done and is competent, one should at least insert one or two sutures to constrict the orifice from which the pedicle has been removed.

SUMMARY

Fatty tumors of the scrotum most commonly take origin from the subperitoneal fat and descend into the scrotal sac by way of the inguinal canal. More rarely the tumor arises from fatty lobules in the spermatic cord. Lipoma of the testes is extremely rare and many of the reported cases are doubtful.

Two cases of lipoma of the scrotal sac are reported. Their origin was most probably from the pre-peritoneal fatty tissue, although it is possible that the first case was an instance of lipoma of the cord.

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INGUINAL HERNIA IN INFANTS*

By ROGER G. DOUGHTY, B.S., M.D.,
Columbia, S. C.

During the past ten years the foreign literature has been replete with reports of series of cases of hernia operations in infants and young children, while the American literature has had only a very occasional article dealing with this subject. Certainly European surgeons are electing to operate upon much younger patients suffering from this condition than are the surgeons on this side of the water. It is quite evident that the tendency toward the elective operation at a very tender age is due, at least in part, to the relatively high percentage of recurrence that is reported both here and abroad after operations upon the adult, while the desire to postpone operation until later life has been dictated largely by the fear of technical difficulties to be encountered in operating upon such small subjects.

Following the descent of the testicle into the scrotum there is normally a closure of the abdominal wall around the cord. That this tendency is present in every individual is obvious. That it does not always accomplish a perfect result is in large part due to the upright position man has assumed, but the failure does not mean that the impulse is absent. This inherent urge to close the opening operates over a relatively long period of time, as is proved by the fact that many times herniae have disappeared without operation. In one case seen in this clinic, the hernia closed spontaneously and completely even though it had previously strangulated and been reduced by manipulation. With these facts known, it seems but a logical step to the view that, given even a hint as to where they should grow, the tissues of the young child will grow there, and that the operative procedures necessary for a permanent cure will not have to be nearly so extensive as in the adult.

If this view is the correct one, and it certainly seems logical, there remain only two factors which might make its application inadvisable or even impossible. They are, first, the question of technical difficulty or physical possibility of execution, and, second, the operative mortality.

The actual execution of the elective operation

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in an infant is much easier than is the same operation undertaken in the presence of strangulation, which has so often forced the hand of the surgeon and yet been successfully dealt with. It is practically impossible of accomplishment unless very small instruments are used, but if they are in accord with the size of the patient the whole problem becomes a relatively simple one. The operation is distinctly feasible. In considering the immediate operative mortality we are obliged to rely largely upon the reports from European clinics for, unfortunately, our own series of cases is too small to be of any statistical value. The reports of course vary, but the mortality seems very low. One clinic reports 780 operations upon 639 children, 232 of whom were three years of age or less, with a mortality of 0.15 per cent, one patient having died eighteen hours after operation of cardiac failure. There were only two recurrences in 359 cases in whom the final result is known. Our own experience with infants in whom operation for this or other causes was necessary does not lead us to expect a high mortality rate.

Early operation, in selected cases, should therefore yield a low mortality. It should give a lower percentage of recurrence than the present unsatisfactory rate of between 5 and 10 per cent commonly reported in this country. It will obviously remove the constant danger of strangulation and its attendant mortality, and of still more importance, by eliminating a constant source of irritation it will permit normal development of the organism.

Because spontaneous cure of the hernia does occur, considerable care must be exercised in the selection of cases for operation. It is the presence or absence of a definite sac which is the determining factor. If a swelling appears in the groin when the child is screaming or struggling, but disappears and remains absent during all or most of its normal activities, the parents should be instructed what to expect, but nature should be allowed a considerable period of time in which to operate unimpeded. In the presence, however, of a scrotal mass or a definitely palpable bit of omentum or intestine outside the external ring, operation is advisable. In the irreducible type, operation is necessary to prevent damage to whatever organs may be incarcerated.

During the operation due care should be taken of the patient. It is well to place the infant upon one or more hot water bottles, either very weak iodin or some non-irritating skin preparation should be used, and instruments should not be placed upon the patient. A narrow table or box set upon the regular operating table is of considerable help. The problem of a dressing is very well taken care of by the use of a subcuticular stitch of silk worm gut in closing with two or three layers of gauze well soaked with collodion, applied directly to the wound. A triangular piece of rubber dam with the apex in the groove of the buttock and the edges held down with adhesive tape completes the protection against urine.

In the operation itself high ligation of the sac and simple suture of the various layers in their proper positions with very small catgut has been found sufficient in all of our cases so far. After the simplest operation, however expeditiously performed, the temperature may reach 105° on the second or third day in the presence of a perfectly clean wound and without any evidence of complications of any kind.

In our cases the length of time elapsed since operation does not permit, nor does the number warrant, the drawing of any conclusions as to the mortality rate or the percentage of cures. Large numbers of cases are needed for such purposes. A few cases can, however, give the individuals doing them a fairly definite idea of the worth of a given procedure, and we believe that the trend should be more definitely toward earlier operation in selected cases.

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NATURE AND NURTURE IN CHILD HYGIENE*

By J. H. M. Knox, Jr., Ph.D., M.D.,
Baltimore, Md.

The subject of this paper has a value in child hygiene that is increasing in recognition each year, and therefore I venture to bring it briefly to your attention in the few minutes at my disposal.

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Two general factors determine the condition of each of us. We are what we are in body and mind because, first, of the character of the material inherited from the past, Nature; and second, because of various influences, chemical, physical and otherwise, which have acted upon us from the time of conception until the end of life, environment or nurture.

In the opinion of many the primary duty of the physician is to recognize and combat disease, to do his utmost for such material as applies to him for aid. The pediatrician devotes his efforts to promoting health and to curing illness among children. Is it not possible, however, that in the pursuit of these splendid aims we have not given so much attention as it deserves to improving at its source the quality of the material with which we have to deal? We all know that much of our time-consuming effort is unproductive because it is expended on patients suffering from some congenital handicaps. The homely adage that "one cannot make a silk purse out of a sow's ear" is pertinent in pediatrics. We all spend much time in an attempt to improve inferior goods and it is to be questioned whether conscientious work in the laboratory, at the office, or at the bedside on behalf of the children who consult us discharges our whole duty to them or to those who are to come after.

The physician who treats children has brought to him first of all the derelicts who are the innocent victims of misfortune or indifference. He first sees the tragic results of ill-considered mating such as the congenital syphilitic, the feeble-minded child, or the child with inherited defects or constitutional weakness. To him first of all is brought the problem child, morose, unhappy, the despair of parents and teachers, the victim of ill-adjusted nature or unsympathetic nurture. It is because he occupies this vantage point of observation that he should be interested not only in practice, but also in furthering those procedures which may improve the racial stock, decrease the number of weaklings and increase the proportion of sturdy children.

Considering the known facts both of inheritance and environment which affect the condition of the child, it is remarkable that physicians in general have been so little influenced, either in work or in thought, by the great advances made in recent years in our knowledge. This may be due to the false idea that genetic studies are thought to suggest only stigmata of degeneration or have to do with insanity or crime. On the contrary, we are beginning to learn that experimental methods of research in heredity have a constantly widening field of application in practical medicine and that the studies of heredity in plants and animals may be of the same kind of service in man as can be research in comparative physiology and pathology.

It has been shown that it may be possible to alter certain individuals with ascertained inherited tendencies through alteration of their environment. Thus the cretin may come to approach normal by ingesting thyroid extract and the congenital diabetic may have his deficiency overcome by insulin.

The effect of inheritance upon infant mortality is not negligible. In an investigation of a thousand families comprising 5,500 children it was shown that the infant death rate of those, one of whose parents lived to be 85 years, was about one-half as high as that of the whole group. Perhaps the best way to reduce the death rate among children is to endow them with stronger constitutions obtained through vigorous and long-lived parents. Thus we see that the problem of saving the lives of infants in which we are all interested has not to do only with the manner in which they are born, fed, reared and protected from disease, but must also reckon with the quality of the material they have inherited.

If one is concerned about the condition of children in this and in future generations, he should seek to answer the question, "Who are, or are to be their parents?" We must be disturbed, therefore, with the present tendency in America and elsewhere for the more capable families either to have no children or to limit the number of their children to one or two. It requires 3.1 children in the average American home to maintain the present population and it is possible that reduced fertility among the fit may render unavailing much of the humanitarian effort of sociologists and physicians seeking to improve environment and to lessen disease.

In view of this real danger in the future we are remarkably indifferent in our attitude to those elements in our population that are notoriously dysgenic. The feeble-minded child is a conspicuous example of this type. These subnormal individuals can be divided into two classes, the hereditary and the accidental groups. The former reproduces its own kind with startling persistency. Out of 144 matings of feeble-

minded persons followed by Goddard, there were 482 offspring, of which 376 were feeble-minded. Nowhere is this enormous problem treated with the seriousness it deserves.

An adequate program for this large group would include a system of identification, registration, instruction, supervision, the latter constituting a kind of permanent parole which would permit only those to live in a community who could do so happily and safely and segregation of those who cannot be properly protected or controlled at home. Such a plan deals in a considerate manner with the feeble-minded person and seeks to develop and use such capacity as he has. It would greatly reduce in a reasonable time the large amount now expended for this class from public funds.

In a recent mental examination of prostitutes in a neighboring state it was disclosed that 76 per cent were definitely feeble-minded with an average mental age of 9 years, although their chronological age was 21. But 5 per cent were said to be mentally normal. Half of them had been married, and more than 10 per cent were the mothers of illegitimate children.

The problem of reducing the number of feeble-minded in our population presents enormous difficulties. For every frankly deficient person there are apparently ten normal persons possessing germ plasm defective in this particular who may beget feeble-minded children. The taint is recessive and where this is true, no means has yet been found to detect it. Some gain, however, would be made if reproduction were prevented on the part of the evidently unfit. Darwin says that "Except in the case of man himself there is hardly anyone so ignorant as to allow his worst animals to breed."

An example of the value to a community of the segregation of the hereditary defective is the treatment of cretins in the Valley of Aosta in northern Italy. In this region the goitrous cretin has been for centuries an object of charity, and often received more through the alms of the public than was paid to the farmer in wages. Cretin mated with cretin, and as a result their number multiplied. In 1890 the cretins of the district were segregated according to sex, and in twenty years this unfortunate group had almost disappeared. Is it not time for the profession to insist that all of those contemplating matrimony should present evidence to a competent medical group that they are free from such conditions as can be recognized which may weaken or destroy their offspring?

It is greatly to be desired that there should be fostered in every community what could be called a "eugenic conscience" so that consideration of the generation which is to come will exert more influence upon the conduct of the present generation. Until this is achieved, aided by the awakened medical profession, the passage of restricting ordinances would be of little value. In certain instances our present marriage laws bring about a deplorable result when, under the guise of legality, two defective streams of germ plasm are compelled to combine to insure the legitimacy of an offspring.

This concern for the future, however, should in no way lessen our sympathy and help for the diseased, unfortunate and defective classes already in our midst. Indeed, it increases our obligations to care for them in the most adequate manner for their own good and for the protection of society.

The initial step we must learn to take is to stop the propagation of the bearers of known defective strains. What has been said in urging the physician to give more heed to Nature, to the toll we are paying for the neglect of some of the known facts of eugenics, does not lessen his obligation to look upon the other side of the shield and recognize the claims of Nurture, the right of each individual to be surrounded by an environment best adapted to develop his inherent powers.

In this field, perhaps, we feel more at home, and it is here that our efforts will bring the most immediate results. It is a comforting thought that, however feeble our ability may be, we are none of us realizing our potential capacities. We all can be and do better. Environmental influences are more potent the earlier in the life of the organism they are applied. Physicians know better than others the ill effects that follow when the germ plasm *in utero* is injured by poison or infected by spirochetes of syphilis. We have learned of the lessened strength and reduced resistance of the infant born of an undernourished or overworked mother. We are familiar, too, with the results of injury to the child through accident or misfortune during labor. In all these instances we have failed to furnish the nurture required for normal development.

After the time of birth the helpless infant, no matter how rich his endowment by Nature, de-

pends upon others for an environment favorable to his physical and mental growth. Much of the effort that is now being bestowed upon the child in school and later is rendered more difficult, some of it ineffective because applied too late, only after the unnecessary disease, remediable physical defect, or blighting nervous habit has made serious inroads. The children's physician should be among the first to recognize the interdependence of Nature and Nurture, that he may give his patients adequate care. He will often be consulted concerning contemplated marriages and will be prompt to suggest such surroundings for his patients as will promote their best capacities.

Child hygiene is a branch of preventive medicine. It is a term which today is spoken "trippingly on the tongue;" it implies grave responsibilities; it includes in its scope not only the protection of the infant from illness and premature death, but the improvement also of our racial stock. It serves truly the present generation, but seeks as well to better those who are to come hereafter. In striving through Nature and Nurture to progress toward our goal, a race of children strong and free from crippling disease, the pediatrician must play a large part.

X-RAY IN TREATMENT OF FRACTURES*

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We are constantly seeking new methods in the diagnosis and treatment of fractures. No pretense will be made to show any original methods. By case reports an effort will be made to show the value of thoroughness in the use of the x-ray. The case reports will be divided into three groups: first, those cases in which no x-ray was taken before the treatment was instituted; second, those in which x-rays were taken but for one or many reasons the findings were not absolutely definite; third, those cases showing the necessity of progress pictures.

The first group indicates the results which follow the failure to have an x-ray taken. The text on orthopedic surgery by Jones and Lovett says:

"The surgeon who undertakes the responsibility of treating a joint injury without examining a good x-ray assumes a very great risk, and it is often a safeguard to have an x-ray of the joint of the other side for purposes of comparison. In so-called sprains which have persisted, one finds a fair proportion of cases with fracture. . . . . Patients are very intolerant of the omission of an x-ray under these conditions, however much they have objected to it at the time of injury, and the risk to the patient and to the surgeon's reputation from omitting x-rays in practically any case of joint injury is considerable."

All suspected fractures should be x-rayed before any treatment is instituted. If the fluoroscope is used, the x-ray should be used just the same. You should have a record before and after the reduction.

In those cases in which the x-ray is used great care is necessary in obtaining absolutely definite information. There are many causes which contribute to oversights in these cases. Briefly, they are as follows: first, films may not be clear, especially in those cases of injury to the pelvis and spine where the Bucky is not used; second, the film may be too small or it may be placed incorrectly and miss the fracture; third, the patient may have fractures of other bones than the one complained of; fourth, both views, anterior-posterior and lateral, should be obtained in every case, and they should not be half views; fifth, corresponding views of the opposite bone should be taken as in cases of fractures of the extremities. This is especially important where epiphyseal lines are near the fractured area; also in these cases where injury occurs in the carpal or tarsal region.

Progress pictures should be taken periodically of cases where fixation is not definite, for example: where a circular plaster bandage is used in the fracture of the forearm near the elbow, or where both bones are broken just below the knee. We find, many times, on removal of fixation that there is a posterior bowing in these cases, in spite of the fact that we have the x-ray record showing that the fragments were in satisfactory apposition immediately following the application of the fixation. And, certainly, in all traction cases periodical x-rays should be made. Practically all up-to-date hospitals now have bedside units to take these cases which are confined to the bed and cannot be moved because of extensive traction apparatus. The x-ray is invaluable in estimating the amount of callus formation. By this means we are able to decide when fixation may be removed and when weight-bearing can begin in cases of fractures in the lower extremities.

Workmen's compensation laws are now quite

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general. In this work we must estimate a man's temporary or permanent disability, and the x-ray is a great help. The opinion should not be based on pictures taken months or years back, but the x-rays should be taken at the time of the examination and compared with all previous ones. For this reason great care should be used in removing films from the record room in all medical legal cases, and when used as evidence in court should be carefully replaced for future reference.

GROUP I, CASES WITHOUT X-RAY

Case 1.—Mrs. J. G., age 55, was walking down the aisle of a street car when the car suddenly stopped and she lost her balance and fell easily to the floor, assuming a sitting position. She was assisted to her feet and walked out of the car and was sent home in a taxi. On examination, there was a swelling of the right foot and ankle, but no evidence of fracture was found, and it was thought to be a typical case of sprained ankle. She also complained of indefinite pain in the back and for that reason she stayed in bed about ten days; she was then able to walk around with only slight pain in the right foot. After six weeks she demanded an x-ray of her spine before she would settle with the traction company. At the time the spine picture was taken a consulting physician suggested that a picture be taken of her foot. The findings relative to the spine were negative, but there was a healed fracture of the fourth metartarsal. She had not complained of the foot for two or three weeks. She stated that her back was severely injured and that the opinions of the physicians who had treated her for the injury at the time were not acceptable to her, and that she had lost confidence in them because they had told her all along that there were no broken bones in her foot. The attorneys for the traction company settled the case at a much higher figure than would have been necessary had the positive diagnosis of fracture been made by an x-ray immediately following the injury.

Case 2.—Mrs. B. K. P., age 55, fell in the kitchen, injuring her right elbow. The physician who examined her made a diagnosis of a dislocation. No x-ray picture was taken. Under anesthesia the dislocation was reduced and a gauze bandage only was applied. This woman was the mother of a physician. After suffering for three weeks with this arm she was brought to the city and an x-ray revealed a typical fracture of the head of the radius.

Case 3.—Mrs. M. M., age 45, fell on the house step. She sustained a Colles fracture. No picture was taken; no anesthetic given; splints were applied extending the full length of the forearm and hand to the tips of the fingers. She came into the clinic five weeks after injury with these splints on. Upon their removal there was a typical deformity with stiff, swollen wrist and fingers. When last seen some two months after her entrance to the clinic she was unable to close her fingers.

Case 4.—Mr. C. B. H., age 30, was picking pecans and fell from a tree, injuring his back. He was able to walk, but in severe pain. He was treated for acute back strain, no x-ray being taken. When admitted to the clinic about three weeks after injury the x-ray showed a typical compression fracture of the twelfth dorsal vertebra.

GROUP II, X-RAYS TAKEN BUT NOT CONCLUSIVE

Case 1.—Mrs. M. H. E., age 65, was run over by an automobile. She was brought into the hospital immediately suffering from a painful shoulder and general shock. An x-ray was taken of the shoulder which revealed a comminuted fracture of the surgical neck of the humerus. This fracture was treated immediately. The following morning she complained of pain in the opposite shoulder and a soreness in the groin. She was taken back to the x-ray room and a picture of the left shoulder revealed a fracture of the outer end of the clavicle. A picture was also taken of the pelvis. The technician suggested that the Bucky should be used for the pelvis, but it was necessary to remove her from the carrier to the table, and we decided to take a flat plate, which did not show any evidence of fracture. Three weeks later, after the clavicle had healed and her general condition had improved, we made another picture of the fractured humerus, as we usually do. Then we decided to take another picture of the pelvis with the Bucky, and it revealed a fracture of the superior ramus of the pubis.

Case 2.—Mr. J. G., age 42, six months before had fallen from a truck and injured his right shoulder. He stated that the physician who treated him at the time took an x-ray picture, but that it did not show a fracture. Our x-ray picture revealed a typical fracture of the greater tuberosity of the humerus with a fragment loose, posteriorly. This fragment does not show well with the anterior-posterior view alone, but by the use of both views it was readily found.

Case 3.—Mr. G. C. H., age 35, was in an automobile accident and sustained an injury to the left side of his head. The usual pictures of the head were taken and no fracture found. We suggested then that a picture be taken from above downward, holding the film under the chin and against the throat and the tube directly overhead. This view showed a double fracture of the zygomatic arch.

Case 4.—Mr. M. R. M., age 60, was knocked down by a street car and sustained a laceration across the base of the thumb. An x-ray was taken of the hand which revealed a fracture through the first metacarpal. The necessary treatment was given and after ten days the plaster was removed and a slight deformity above the wrist was noted. Another x-ray was taken of the wrist, which revealed a Colles fracture with only a slight displacement. In the first case the film was too small to include any part of the radius.

Case 5.—Mr. A. H. D., age 21, a college athlete, hurt his wrist playing football. An x-ray was taken and no fracture found. He complained of pain and was unable to continue athletics for several months. Later he began training for the track team and found that he could throw the discus with no inconvenience, but he could not put the shot, that is, traction did not hurt, but compression did. An x-ray at this late date revealed a typical fracture through the scaphoid of the wrist. In the first instance the oversight could have been avoided, probably, by taking both views of both wrists in the same relative positions.

GROUP III, CASES WHERE PROGRESS PICTURES SHOULD HAVE BEEN TAKEN

Case 1.—Mr. E. A. P., age 20, sustained a fracture of the lower femur four inches above the knee. No x-ray was taken, but the patient states that the surgeon

fluoroscoped the leg at the time the plaster bandage was applied. After five weeks the plaster was removed and there was no union. He was removed to our clinic and the x-ray showed a marked overriding of fragments. This man was put up with plaster spica with traction, and periodical pictures were made, which revealed that the fragments could be pulled down in satisfactory apposition, and callus formation noted. In the first instance the failure to use the x-ray resulted in a temporary failure, and in the last instance it showed that by proper traction satisfactory apposition could be obtained, thereby avoiding open reduction.

Case 2.—Mr. L. E. P., age 24, a lineman, fell from a telephone post, sustaining a compound fracture of both bones of the lower leg four inches above the ankle. His first treatment was given in a small town, where a wound was treated by first aid pack and long leg cast applied. There was no infection, but the wound on the shin healed slowly, taking about three weeks. The x-ray showed a slight offset of the fragments when he first came in, but after the wound had healed and permanent fixation was decided upon, there was marked overriding of the fragments. A sinclair skate was then applied, the fragments were pulled down to a satisfactory position, and sufficient callus was produced to allow the use of another circular plaster bandage. The result was excellent.

Case 3.—Mr. M. E. S., age 22, a medical student, sustained a fracture of both bones of the forearm three years ago. An anesthetic was given; the fracture reduced, and the arm put up in a circular plaster bandage extending from the axilla to the tips of the fingers. X-ray was taken immediately after and the fracture was in very good position. Before the cast was removed the patient stated that the plaster was very loose and that he could move his arm around in it. When the fixation was finally removed in about six weeks, it was found that the bones had bowed posteriorly. It was now too late to correct by manual manipulation, and as a result he now has a deformity of the forearm which is not only disfiguring, but disabling, because of the loss of rotary motion in the forearm. This deformity could probably have been prevented had a picture been taken at the end of two weeks, and the necessary correction made at that time.

DISCUSSION (*Abstract*)

Dr. C. N. Carraway, Birmingham, Ala.—No fracture can be properly and correctly diagnosed without the aid of the x-ray. It is impossible to diagnose in any accurate way the different types of fracture and the position of the fragments without the use of the x-ray. No surgeon without this accurate knowledge of the type and position of fragments can intelligently outline the form of treatment that such a fracture needs, as one type of fracture demands certain kinds of fixation while others are different.

It is practically impossible to hold a smooth, oblique fracture of the long bones or a spiral fracture with any form of fixation other than continued traction, while transverse fractures and fractures with rough, jagged fragments can be held by fixation method.

X-rays are very important in determining whether callus is being produced and the type, quantity and quality of the callus. Three of my patients showed no evidence for several months of producing any callus whatever, although the fractures were in good coaptation and alignment without any intervening soft tissue.

Every patient should be followed up by x-rays made by bedside units to determine the progress of the union and the position, from time to time, until there is complete union. This makes it almost compulsory for a patient with a fracture of the body or lower limbs to be treated in the hospital. If it is of the upper extremities, he can come back and forth to have pictures made at intervals.

The x-ray has served to remove patients with fractures from the hands of general practitioners to the specialists in bone surgery because of the many errors proven to have been made in reduction of fractures, and because of the increasing number of damage suits in fracture work.

I should like to say that at least 90 per cent of all damage suits are the result of remarks by some fellow practitioner, either from thoughtlessness or petty jealousy, in trying to gain the favor of the patient. If the x-ray is used properly there will be less occasion for suits.

Dr. H. Earle Conwell, Fairfield, Ala.—One of the most important things in the treatment of any patient is cooperation between all consultants. Unless the surgeon who is treating the fracture gives the radiologist a proper history of the case it seems to me that criticism of the x-ray should not be made.

We see numbers of cases with negative x-ray reports with physical findings of marked swelling, pain and tenderness which should be treated as fractures. It does not justify one to criticise the negative x-ray report, but it does behoove one to depend on his physical examination as much as on the x-ray report in these cases and treat them as fractures.

If the above precautions are carried out, the high percentage of mal-practice law suits against the medical profession for the treatment of fractures, which is about 68 per cent of all mal-practice cases, will greatly decrease.

Dr. W. H. Livermore, Chickaska, Okla.—A great number of mal-practice suits, as was said, are on fractures. The reason for this is that they can be shown, and many physicians have the same idea as the laymen and lawyers: that a fractured bone should look after it is set just as it did before it was broken.

Our endeavor should always be to secure as nearly an anatomical relation as possible, but the big thing is to have a functional limb or member after the recovery. Many of these will show marked anatomical changes when the function is good. But the anatomical changes can be brought out in court by x-ray pictures and it can be made to appear that the fracture has been badly handled when in fact it has been well handled.

The fracture may have been well handled, even though the x-ray picture taken afterwards does not show an anatomically perfect bone.

Dr. J. A. Key, St. Louis, Mo.—Most fractures, especially by the men in this Section, can be diagnosed without the x-ray fairly accurately.

I think there is a tendency at the present time, especially by younger men who are taught fractures in medical centers, to neglect physical diagnosis and depend almost exclusively on the x-ray for their diagnoses. There is, of course, an ideal treatment of fractures and there is a practical treatment.

Many of us are inclined to forget that x-rays are expensive to the private patient. While it is nice to have x-rays before and after, from week to week, in

the course of our treatment of fractures, where the number of x-rays (which a patient can afford) is limited, it is infinitely better to diagnose the fracture by physical examination; that is, begin treatments, and then get the x-ray to check up your results.

RELATION OF INTERNIST AND PRACTITIONER TO CANCER PROBLEM*†

By DAVID P. BARR, M.D.,
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The control of cancer constitutes one of the greatest medical problems of the day. Whether or not there is a higher incidence of the disease, there can be no doubt that interest in cancer and the active steps taken for its control have greatly increased during the past few years. A comparatively large number of journals are now devoted exclusively to the consideration of new growth and, more and more, articles on cancer are appearing in the general medical publications of all countries. Organized effort is evident in such societies as the British Empire Cancer Commission and in our own Society for the Prevention of Cancer. The most modern methods of publicity are being utilized by these organizations and the press is cooperating with eagerness because of the very real and fearsome interest which the public has in the subject. Education in these matters is causing many more people to seek early medical advice for which they naturally apply to the family physician or to the internist who presumably is most skilled in the art of diagnosis.

The subject of cancer is of vital interest to the practitioner both from a diagnostic and a therapeutic standpoint. To his office come occasionally and unexpectedly patients presenting most difficult problems in the early diagnosis of new growth. The variety is too great to allow even casual mention.

It is difficult to estimate how many of the diagnostic procedures performed for the individual patient in our best hospitals and in the internist's office could be abandoned if there were no fear of early cancer. Without any figures it is apparent, however, that our course in practice is constantly influenced by this specter of new growth. Patients frequently present themselves for physical examination simply because of their dread of cancer. Those past middle life require the most searching examination to rule out the possibility of its presence. Consultations otherwise not indicated are called by the practitioner because of the suspicion of early neoplasm. X-ray examinations of all sorts, gastric analyses, proctoscopic examinations often have the early diagnosis of cancer as their sole object. And once the diagnosis has been established the patient may and often must look to the practitioner for advice and counsel. Direction must be given concerning the nature of treatment: whether an operation should be performed or radiation therapy employed. Prognoses which affect the lives of the patient and his family must be given from the result of the examination.

A heavy responsibility rests upon the internist and the practitioner both as to the correct diagnosis in most early cases and as to proper prognoses and advice concerning treatment. To fulfill the requirements of this responsibility great knowledge is necessary. Cancer presents a clinical problem at least as complex as that of tuberculosis or syphilis. There seem to be numberless tumors benign and malignant. One of the great fallacies of the past has been the opinion that one could group tumors into certain large categories such as fibroma, angioma or carcinoma and could prognosticate for each group as if it represented a distinct clinical entity. It has been one of the principle functions of Ewing's great book to demonstrate that for each location there may be a different natural history, a different prognosis and a different treatment even though the pathological lesion be the same. The natural history of neoplasm represents an immense study. Clinical experience is of vast importance and mistakes in judgment are apparent all too early.

Although the internist is called upon at any time to pass on these difficult problems, his opportunity under present conditions to gain the necessary experience is far too limited. Cancer is generally considered a surgical subject. Many who suspect cancer present themselves to the surgeon. Those in whom cancer is diagnosed may be referred to him immediately and are seen again by the internist only in a stage too late for study or treatment. The opportunity of the practitioner is no better. In Massachusetts, where the incidence of cancer is greater than in any other state, the average practitioner is said

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to see not more than five cases each year.[1] The literature is not likely to help him, since most articles on cancer appear either in surgical or in special journals which he does not often see.

Under present circumstances the diagnostician cannot escape the consideration of cancer in his clinical work. He must make the most difficult diagnoses of early cancerous changes. He cannot escape giving advice to his patients concerning treatment. At the same time the present distribution of cases and the surgical emphasis on the whole subject makes it extremely difficult for him to obtain sufficient experience for mature clinical judgment of the individual patient. With the increase in the relative importance of cancer and the awakening of the public it is more necessary than before that all of our knowledge concerning early diagnosis and efficient treatment shall be readily available to the public and shall be supplied by the practitioner.

There are other reasons for increasing interest at this time. In the last few years there have been two great advances which permit us to hope that exact information concerning the true nature of cancer cannot be long delayed. The first is the development of methods of tissue culture; the second a contribution to the knowledge of the chemistry of tumor cells which perhaps gives us an entering wedge into that most necessary field of knowledge, the energetics involved in the process of growth. The science of tissue culture has developed rapidly since 1911, when Burrows was able to apply the method of Ross Harrison to mammalian tissue. Both normal and tumor tissue now grow and continue to grow in the test tube under a variety of conditions. Cells such as fibroblasts which have a feeble growth potential in the body acquire, under proper environmental conditions, the quality of unlimited growth, which was formerly considered the exclusive property of malignant neoplasms. It is interesting that the growth of tissue in the test tube can be greatly stimulated by addition of certain substances. Extracts of the fresh tissue from rapidly growing younger embryos or from cancer tissue stimulates great activity in the growth. Extracts of older embryos and of adult tissue on the other hand have little effect. These experiments have led to the suggestion that there may be some specific chemical or enzymatic substance which can bring about the transformation of a normal into a pathological cell.

Of the chemical processes involved in this change we are just beginning to have some inkling. The mechanism of the rapid growth of carcinoma has been a complete mystery. To live, and even more to grow, cells must have energy. It was a most natural assumption that in a rapidly growing cancer there would be an increase in the oxidative processes quite similar to that of the mother carrying her child. When the method of measuring the basal metabolism became effective, cancer was one of the first subjects for investigation. One naturally expected to find an increased oxygen requirement in a person growing a large tumor. This expectation was not fulfilled. To this day there has never been demonstrated any increased oxidative rate even in those bearing the largest and most distressing tumors. Growth, however, cannot be accomplished without the expenditure of energy. We now have at least a partial answer to this puzzling question. Otto Warburg[2] and his associates at the Dahlem Institute have been able to show that tissue from malignant tumors has the extraordinary property of being able to glycolyze, that is, to convert carbohydrate into lactic acid at a rate many times that of normal tissue. We know that this is a non-oxidative reaction and requires no oxygen for its accomplishment. Moreover, we know that whenever carbohydrate is converted into lactic acid a large amount of energy is liberated, the result of conversion of a more complex into a simpler molecule. Cancer tissue has, then, a double source of energy. It not only has the ability to oxidize foodstuffs, but possesses also a previously hidden but none the less important extra source of energy which is produced at the site of the tumor and which may possibly become immediately applicable to the processes of growth. It is of great interest that this chemical reaction of glycolysis is not the exclusive property of cancer tissue. It is possessed to a lesser extent by benign tumors, by embryonic tissue and by the chorion. In fact, an increased glycolytic activity is found to be a property of all growing tissue.

As the result of these brilliant researches we may be in possession of one of the great chemical secrets of growth, not only of the unlimited and relentless development in cancer, but of the normal growth in the embryo as well. We are led to believe also that the chemical difference between normal growth and that of malignant neoplasms is a quantitative one and that the property that permits growth is present to some extent in all living cells.

The ability to study growth of normal and abnormal tissue under artificial conditions and the availability of precise methods for its analysis and chemical investigation constitutes an enormous advance and gives promise of early and important development. For the first time we have a functional or physiological approach to supplement the morphologic researches of the last century. Although this seems a far cry from the clinic, the experiments of Warburg on the ability of growing tissues to glycolyze may be considered in a way similar to the discovery of Minkowsky that the pancreas was concerned with the carbohydrate transformation of diabetes. Many years passed before the discovery of insulin, but the constructive work in the conquest of diabetes dates from that time. The chemical and biological studies now being carried out in cancer research may well occupy the interest and attention of the practitioner.

The practical management of cancer has also undergone a fundamental change in the last few years. At a time when surgery represented the only hope and when surgeons were performing quite justifiably more and more radical operations there came from a most unexpected source, that of experimental physics, a new agent and a new hope. The discovery of the x-ray and the similar gamma rays of radium marks one of the few epochs in the history of the treatment of cancer. Soon after the isolation of radium was accomplished that fortunate physicist, Becquerel, accidentally burned himself with the new element while he was carrying it in his pocket on his way to a lecture. Almost immediately the possibility of the application of radium to the treatment of cancer was conceived. High hopes were raised. The effects of a few favorable cases were widely heralded, but as is usual after such enthusiasm, a reaction set in and hope was all but lost in the midst of subsequent failures and the distressing burns caused by the injudicious use of the powerful new agents. So strong has been the reaction that there are still those high in the profession who consider that x-ray and radium are merely passing phases in the long history of failure in the treatment of cancer. Many more look upon them as rather hopeless procedures to be employed after surgery has done its best. But in the midst of this pessimism there has grown up a science concerning the use of radiation, a knowledge of how to control its more favorable action, of when it should be combined with surgery, of when it is better than surgery and of when it must not be used. Early operation must still be considered the chief hope of the patient with cancer, but it is no longer the only hope. In selected cases the results from both x-ray and radium may be equally successful. In at least one large cancer hospital, tongues are no longer removed for lingual cancer. Lip cancer is seldom operated upon. Following a period in which extremely complete operations were considered essential, opinion is now quite generally held that radical surgery is never desirable at any stage in the treatment of cancer of the cervix of the uterus. Hundreds of mutilating operations have been avoided, and the latest statistics seem to indicate that the results with radiation in these particular forms of cancer are quite as good as the best of the previous surgical records.

Unfortunately, this most important knowledge is not so widely diffused as it should be. One finds in many places radical surgery performed daily in cases which would respond equally well, or sometimes better, to radiation. It is the commonest experience to find insufficient superficial x-ray treatment when the most extensive deep therapy is indicated. One sees too often serious chronic and almost incurable burns from radium or x-ray due to too enthusiastic or inexpert application.

The lack of knowledge concerning these agents is not entirely responsible for their misuse. The agents themselves represent so large an investment and so great an expense that there are relatively few communities which can boast of anything approaching adequate facilities. But while the technic and facilities for radiation are not widely known, the increased hope for cancer patients is none the less real and the actual accomplishment in the alleviation of suffering has already been very great.

With this development, the relation of the internist and the practitioner to cancer has changed materially. The question, "Is the patient operable?" is no longer sufficient. One must ask, "Should there be an operation, or should the treatment be by radiation? Should they be combined? How may radiation best be applied?" These are complex questions which for correct answer require most careful and extensive study and a large and varied experience.

There is another side to the problem. The question of cancer control is not alone concerned with the individual. It has also an important

public health aspect. The fight against cancer may be considered in some respects similar to that which has been waged against heart disease, tuberculosis or syphilis. It is as great a problem and infinitely more complex than any of them. Much has already been done by the American Society for the Prevention of Cancer. A movement perhaps of greater importance has recently been started in Massachusetts, where cancer clinics are held regularly in a number of the larger cities. These are under the auspices of the State Board of Health, but they are conducted by the local surgeons. They are held not only for the purpose of early diagnosis. They serve also as centers for the distribution of literature and for information concerning cancer. Their propaganda is conducted throughout the year and thus stands in favorable contrast with the intermittent propaganda of Cancer Week and occasional local agitation. So far, all of this extremely important preventive work has been carried out by surgeons or pathologists. It seems high time that the internist and the practitioner participate with them in the efforts to conquer this most destructive disease.

If the public is to receive the best which we have to offer in the control of cancer it is necessary that every locality have some special mechanism for the assembling of cancer patients. In some instances this may require the establishment of a special hospital or a large cancer service in an already existing one. In others it may take the form of a cancer clinic, such as those recently established in Massachusetts. For this work individual enterprises will scarcely be sufficient. It is likely that the best results will come from the cooperation of a group of which the internist is a member and in which the general practitioners have an active interest.

Continued and increasing efforts to educate the public concerning prevention and the benefits of early treatment must be made. The extension of present propaganda will bring more and more patients to the physician's office for early diagnosis. It is apparent, however, that the results of such education will be extremely limited unless the physicians of each community possess the specialized knowledge and the facilities necessary for the best diagnosis and treatment.

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DISCUSSION (*Abstract*)

Dr. Sydney R. Miller, Baltimore, Md.—Cancer has been and still is regarded as essentially a surgical problem. However, cancer is perhaps primarily a problem for the internist not only from a diagnostic point of view, but quite as much from a therapeutic standpoint. A diagnosis established, operation is of course the primary court of appeal, and until our knowledge of cancer is resolved to a chemical or functional basis it will probably remain so. Other measures in the treatment of cancer, such as deep x-ray therapy, radium or colloidal lead, are incompletely understood, even by those who devote their full attention to their study. It is none the less incumbent upon internists to have first-hand knowledge of these therapeutic measures: when to use and when not to use them, and the significance of distressing reactions.

The internist has also his share in the problem of the education of the public as to the importance of early diagnosis of cancer. The internist, logically, is the person who is most apt to have the widest general knowledge of his patients.

There seems to me to be an ever-growing type of a particularly pernicious form of cancer, mental cancer, which takes the form of fear. The devastating disease of fear is sweeping rapidly through our Country, not merely with reference to cancer alone, but to various other types of disease. This attitude of fear is perhaps an expression of the fact that both our knowledge and our lack of knowledge of it are improperly implied in our publicity campaigns. Fear, whether justified or not, does as much harm physically and economically as the thing feared does itself. Consequently in our attempts not only to cure but to bring to the public what we know, and what we are trying to do, let us not forget the importance of psychological aspects of the problems which are of tremendous practical importance.

Dr. Barr (closing).—There has been perhaps an unjustified pessimism concerning our knowledge of cancer. Possibly we have been waiting too eagerly for the discovery of a single, all-embracing cause of cancer or for a certain and universal cure. As a matter of fact, we know many causes for cancer. No one of these is the fundamental cause, but each for the individual may represent the exciting cause without which the cancer would not have occurred. We also know that we may cure a large number of early cancers most often by surgery, not infrequently by radiation. We should utilize the knowledge which we already possess much more completely while we are waiting for the knowledge which is certain to come in later years.

Dr. Miller has brought up the question of the psychological effect which cancer propaganda may have upon the community. The Cancer Weeks which have been conducted by the American Society for the Prevention of Cancer have unquestionably accomplished beneficial results. Possibly they have had, however, some of the aspects of the revival meeting in that they have caused a temporary interest or even anxiety without making sufficient provision for permanent improvement of real conditions. The campaign which has been recently started in the State of Massachusetts, where cancer clinics are established in the cities of medium size and where cancer propaganda goes on throughout the year, may for the present serve as a model for the education of the public and as an aid for the individual physician in the problems of new growth.

ACUTE URINARY EXTRAVASATION*

A CLINICAL STUDY OF SEVENTY CASES

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Among the acute affections of the genito-urinary system, urinary extravasation is one of the most pressing emergencies. It is second in importance only to acute retention of urine, to which it is closely related, and is perhaps the most serious complication of stricture of the urethra. In spite of the seriousness of the condition, often apparently desperate cases can be saved by appropriate immediate surgical treatment.

These facts are adequately demonstrated in the following study, which includes all those cases which have been admitted to a large charity hospital during a period of ten years. The patients have been operated upon by several general surgeons, as well as by urologic surgeons, so that a variety of surgical measures has been employed. It is, therefore, with a consideration of mortality and morbidity in reference to the different operative procedures that this publication is chiefly concerned.

SYMPTOMS

The symptoms include subjective and objective local and systemic characteristics. Of the local subjective signs, pain in the perineum is most early and constant. Difficulty in urination may vary from dribbling to complete anuria. Following the pain of rupture the greater pain of extravasation appears, which is repeated and augmented by every attempt at urination. When the process continues to the stage of decomposition and infection, all the local suffering of an extending cellulitis and abscess appear.

The subjective systemic signs usually are, at the time of rupture, in the nature of a chill, followed by fever of a hectic type with wide excursions. This feature was constant in the entire series of cases. Marked general weakness and prostration develop and all the signs of sepsis are manifest in the circulatory, respiratory, nervous and urinary systems. The pulse is often rapid and thready, and respiration fast and excited. Early, there is usually increased excitability of the nervous system, and later, depression when the chills and fever are well established.

The objective local symptoms are the boggy swelling of the anterior perineum, scrotum and penis. Swelling of the perineum and scrotum was present in all cases, usually appearing somewhat later than the perineal pain. Swelling of the scrotum may be considerable. Sometimes it becomes as large as a grapefruit or a child's head. The penis is usually enlarged and distorted, often so that the prepuce cannot be retracted. The skin is of a thin glazed appearance, hyperemic and tender. Suprapubic swelling was present in all of the twenty-one cases. The height on the abdominal wall that the swelling reaches varies. The more remote locations of the swelling include the lumbar region, groin and buttocks. Gangrenous patches on the scrotum or penis were present in twenty-five instances, and in six cases it had progressed to the stage of sloughing.

Objective local symptoms also involve the gentle exploration of the urethra by means of a soft instrument which may locate strictures and determine the patency of the urethra. Rectal examination often detects the presence of a tender, boggy swelling below the prostate. A fluid may also be aspirated from the swollen tissues containing as much as 2 per cent urea. Leucocytosis is usually high. In this series it varied between 17,500 and 27,500 in the few cases where it was recorded.

DIAGNOSIS

The diagnosis is usually easy, but varies in difficulty with the duration and extent to which general symptoms mask the local condition. A history of the complications of neglected gonorrhea and urinary difficulties is obtainable in most cases. History of a tearing sensation upon forceful attempts at urination is often elicited, or the passage of a sound may have been followed by a harsh raw feeling and hemorrhage instead of smooth progress along the canal. Complications have often demanded previous operative work, as the drainage of a perineal abscess or external urethrotomy.

In those cases of rupture along the deeper parts of the urethra, marked general symptoms may be present before local manifestations are diagnostic. A patient complaining of chills and fever, sweats, cough and abdominal pain was diagnosed pneumonia until the local condition became more marked. In two patients typhoid

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fever was suspected because of the insidious onset of chills and fever, diarrhea, difficult urination and general weakness. The condition was similarly mistaken for malaria and acute bronchitis.

Difficulties are also encountered in the interpretation of local signs. Scrotal edema may be due to other causes, as the anasarca consequent upon a failing heart or spreading cellulitis from an inchiorectal abscess. In one patient, the condition was wrongly diagnosed erysipelas of the genitalia. In three others, perineal peri-urethral abscesses were thought to be present without extravasation.

TREATMENT

Since this is one of the most malignant of inflammatory processes, treatment should be prompt and energetic. Delay is in no other condition accompanied by greater danger. Operative treatment to combat the local condition must be bold and radical in order to be efficient. The objects to be attained are (1) the checking of further extravasation by drainage of the bladder; (2) treatment of the damage already done by free incision and drainage of the inflamed and infiltrated parts; and (3) restoration of the urethral lumen. All surgical procedures failing to attain these three measures should be regarded as inadequate.

These cases may be classified into the following groups as regards surgical therapy:

TABLE I—OPERATIVE PROCEDURE

	Cases	Deaths	Mortality %
No surgical treatment	3	3	100
Inadequate treatment, multiple incisions only	5	4	80
Multiple incisions and suprapubic cystostomy	18	10	44
Multiple incisions and perineal cystostomy	37	10	28
Multiple incisions and both perineal and suprapubic cystostomy	7	3	43
Total	70	28	40

Three patients were thought to be in such a serious condition upon entrance that surgical measures would be of no avail. One of these died during examination. Another died eight hours later, being moribund upon entrance. The remaining patient died after being in the hospital two and one-half days without surgical therapy. This demonstrates that these patients may live several hours, although semi-comatose and apparently in a moribund condition. It constitutes a most forceful argument for immediate radical surgery, no matter what the patient's condition may be. When it is obvious that the patient will not tolerate removal to the operating room, operative procedures should be performed in the patient's own bed under local anesthesia. In operated cases the rapidity of improvement from a moribund condition to one of ease has been as striking as the original malignancy of the infection.

Multiple incisions only were employed in five cases, four of which died. This procedure is recommended by Kidd, who leaves the urethra severely alone, passing no instruments. He cautions against any attempt to put the finger or any tube into the bladder and is content with multiple punctures and incision and drainage of an abscess when present.

It might be argued that a peri-urethral abscess is an attempt by Nature to perform external urethrotomy and by incision of the abscess Nature's object is achieved. But in many cases no typical peri-urethral abscess is present and there is no sudden copious drainage of pus and urine upon incision. Moreover, the intra-urethral pressure and condition remain the same and extrasavation of urine may continue as before.

In three of these five cases patency of the urethra was a factor in the decision to stop with multiple incisions. In so doing the fact is neglected that urinary extravasation may occur with strictures of large caliber and the underlying mechanism of extravasation thus remains untreated. Such patients may exhibit the uremic and infectious symptoms of those with tight and impassable strictures. There must be the same retention acting upon kidneys already damaged by back pressure which has extended over a long period. In such cases it is of utmost importance to relieve the condition by draining the bladder. Even with a retention catheter in place it seems that infiltration of urine may continue at the original site outside of the catheter.

Multiple incisions and suprapubic cystostomy have been recently recommended by Wolfer. Baily and Huddy raise the objection that infection can be carried to the space of Retzius by this method with danger of deep pelvic cellulitis. They cite a fatal case in which this occurred. In one of our series cellulitis extended to the peritoneum, producing localized peritonitis, which was complicated by a fecal fistula.

Further, if the bladder is much distended and the patient uremic, the immediate effect of a suprapubic cystostomy will be to depress the renal efficiency still further.

Suprapubic cystostomy does not facilitate dealing with the underlying pathological condition as does the perineal operation. Deep periurethral abscesses and accessory pockets of pus and urine cannot be connected and adequately drained. Necrotic portions of urethra might thus be unrecognized. More adequate bladder drainage also results by the perineal route, since the influence of gravity persists with suprapubic drainage.

The suprapubic route is favored by some surgeons in order that retrograde dilatation through the bladder may be performed. But as regards restoration of the urethral lumen, the suprapubic method is no more efficient than the perineal, and, in the hands of the urologist skilled in perineal surgery, treatment of the urethral condition perineally is much more satisfactory. In the seven cases in which the combined methods of suprapubic and perineal cystostomy were employed, the perineal operation was added so that urethral dilatation could be completed. Fistula may persist by the suprapubic route as well as the perineal, and the former may require perineal surgery for its closure and the reestablishment of the function of micturition. Although suprapubic cystostomy may be a life-saving procedure at the time, the perineal operation may be required later to deal adequately with the perineal condition, reestablish the urethral lumen, and thus allow the suprapubic fistula to close. These features are well illustrated in the following case:

A negro aged 35 years had been troubled with complications of chronic gonorrheal urethritis for fifteen years. External urethrotomy had been performed for stricture ten years previously, but urinary difficulties persisted. Frequent peri-urethral abscesses presented in the perineum and discharged spontaneously. A urinary fistula had been present for some time.

Upon admission to the hospital, there was marked edema of the perineum, scrotum and penis, a temperature of 103° and marked prostration. An emergency operation of suprapubic cystostomy with multiple incisions of the inflamed edematous parts was performed. A gauze drain was placed in the space of Retzius. Infection spread to this space, which in turn involved the peritoneum and contiguous loops of intestine. Eight days after the operation feces discharged through the suprapubic wound. During the next week his condition was exceedingly critical, though he eventually recovered from the septic process and the fecal fistula closed spontaneously.

Urine continued to drain from the suprapubic wound and it was impossible to dilate the urethra. Six weeks after the first operation he was re-operated by the perineal route. External urethrotomy with a guide was performed and strictures of the bulbomembranous urethra divided. At the same time several abscesses about the root of the penis were incised. A tube was inserted into the bladder.

The suprapubic fistula healed in ten days, and in two weeks he was discharged from the hospital to return to the dispensary for further instrumentation.

Multiple Incisions and Perineal Cystostomy.—Since it is obvious from an inspection of the mortality statistics that this is the method of choice, it will be given in detail.

The urethra is washed out and a local anesthetic solution instilled. It may be necessary to incise the prepuce in cases of marked edema and distortion. An attempt is then made to pass a bougie into the bladder. Great gentleness is exercised, for the urethra is inflamed and edematous and is easily perforated. In fact, a false passage may already have been performed. The introduction of several bougies by the "faggot method" is usually of distinct value, after which it is usually possible to introduce a LeFort catheter, preceded by a filiform guide. The introduction and fixing of a guide in position greatly simplifies the subsequent stages of the operation. Sacral anesthesia is then induced, for the uremic condition of the patient usually makes a general anesthetic more dangerous. If a bougie cannot be introduced into the bladder, external urethrotomy without guide must be performed. With a bougie passed and fixed in position, the patient is placed in the lithotomy position with a sandbag under the hips as for perineal prostatectomy. The scrotum is held up by means of wet towels or towel clips, if necessary, thus exposing the perineum clearly to view. The operative field having been prepared, an incision is made from the base of the scrotum to within one-half an inch of the anal verge, keeping strictly to the middle line. The tissues in this region are usually extensively infiltrated so that one has to proceed to considerable depth before an abscess is reached. Putrid urine and pus then usually escape under pressure.

A finger may now be passed into the wound and the urethral bougie be sought for palpation. Retractors are placed on either side of the wound and the urethra exposed and inspected. The floor of the urethra is then incised in the bulbous portion and the edges retracted. The left index finger is passed into the dilated urethra against the bougie, being thus guided into

the bladder. A large rubber tube is then passed along the index finger into the bladder, and stitched to one side of the wound. In greatly distended bladders it is inadvisable to withdraw all the urine at one time, but to evacuate at four-hour intervals.

The left index finger is now passed through the perineal wound upward and outward over the crus penis until it protrudes subcutaneously above and to the outer side of the symphysis pubis. The skin is incised over the tip of the finger and long curved forceps retrace the path and emerge in the perineal wound. The jaws are opened and grasp a gutta percha cigarette drain previously well perforated, which is pulled up and fixed by a stitch. This procedure is repeated on the opposite side.

Incisions into the infiltrated tissues should be large and sufficiently deep to provide adequate drainage. There is a tendency on account of the infiltration for the incision to be too superficial. They should always penetrate deeply enough to include the limiting fasciae. Hot moist dressings are applied over the abdominal wall, perineum and scrotum. These are covered over by packing towels and the whole is secured by a T-shaped binder with two wide perineal strips.

In this connection it is interesting to note that Sir Benjamin Brodie advised perineal cystostomy and multiple incisions almost a century ago. By this method he claimed to have lowered the mortality from five out of six to a recovery of the majority. With such brilliant results before the era of asepsis, it would seem that under modern conditions and advantages a more widespread adoption of these basic principles should improve the prognosis of these emergencies.

SUMMARY

A clinical study of seventy cases of urinary extravasation is given with special consideration of the mortality with reference to the different operative procedures.

Operative treatment to combat the local condition must be bold and radical in order to be efficient. The objects to be attained are (1) the checking of further extravasation by drainage of the bladder; (2) treatment of the damage already done by free incision and drainage of the inflamed and infiltrated parts; (3) restoration of the urethral lumen.

Mortality statistics in this series of cases indicate multiple incisions, perineal cystostomy, and retrograde perineal dilation to the operative procedure of choice.

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PHARYNGO-ESOPHAGEAL DIVERTICULUM: CASE REPORT*

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Definition.—An esophageal diverticulum is a circumscribed protrusion of the esophageal wall caused by pulsion or traction; it is a pouch whose cavity connects with the lumen of the esophagus.

History.—Bell is usually credited with having first described esophageal diverticula in 1830, though an earlier report is that of Ludlow in 1764.

Rokitansky, in 1840, made the distinction between diverticula that were caused by pressure from within, which he called pulsion, and those caused by traction from without which he designated as traction diverticula.

Then came the report of Kluge in 1850. And in 1877 Zenker and von Ziemssen described the pharyngo-esophageal diverticulum, and since the condition has often been called the Zenker diverticulum. Very little has been added to the description by these authors of the condition.

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Fig. 1—Diverticulum shown with barium emulsion retained in the trachea above. Shadow of aorta is shown.

Reitzenstein, in 1898, was the first to recognize the condition with the x-ray.

Nichous in 1881 is given credit for having made the first extirpation.

Incidence.—The routine use of the x-ray in diagnosis has proved diverticulum of the esophagus to be much more common than was formerly supposed: and though it is by no means rare, it usually goes unrecognized unless the x-ray is used. Carman advises that if a patient is seen who has any difficulty in swallowing, a diverticulum should be looked for.

The condition rarely appears before the age of forty-five. The average age in the cases reported by Judd was fifty-five, and the symptoms had persisted for about six years.

In the cases reported by Jewett the average age was sixty-three. His cases were between the ages of fifty-two and seventy-seven.

The condition occurs more often in men than in women.

Symptoms.—The beginning of the condition is not recognized until there is difficulty in swallowing, though there may be a persistent cough due to irritation of the trachea or recurrent pharyngeal nerve.

The symptoms naturally are in proportion to the size of the sac. While early in the disease there may be only moderate difficulty in swallowing, later there may be a sensation of pressure or fullness in the neck and often there is a visible swelling on the left side of the neck when the sac is full.

Dryness of the throat is later complained of and there may be an unusual accumulation of mucus. Undigested portions of food may be raised and in the large diverticula there may be a foul breath. With ulceration, which sometimes occurs, there is pain. When the difficulty in swallowing becomes extreme there is loss in weight.

Morbid Anatomy. — Dilatations of the esophagus are usually produced by spasmodic contraction of the cardia, or by stricture, either malignant or benign. They are fusiform and occupy a position just above the constriction. They are almost always thoracic, and usually are in the lower third of the esophagus.

A diverticulum instead of a diffuse, or fusiform distension, as in dilatation of the esophagus, is formed, because there is some localized or circumscribed weakening at some point in the wall of the esophagus. In traction diverticula, which occur at any portion of the esophagus, there is usually some near-by structure, often a lymph gland, which, through a process of inflammation, becomes adherent to the outside of the esophagus and in the formation of scar tissue which follows the inflammation the wall is pulled out at this point, producing a protrusion. The formation of the protrusion is assisted by the motility of the esophagus which in move-

Fig. 2—Shows the diverticulum to the left of the esophagus.

ment pulls itself away from the adherent portion.

Such traction diverticula are usually found only in the thoracic portion of the esophagus. They occur frequently in tuberculous individuals, are often multiple, are usually small and without symptoms, and are discovered at autopsy.

It is estimated that about 7 per cent of these traction diverticula become traction-pulsion and increase in size.

Hawes reports two cases of traction diverticula with rupture, one into the lung, and the other into a bronchus. Both were in tuberculous patients.

Congenital defects possibly play a part in the production of thoracic diverticula, though William Boyd states that congenital esophageal diverticula do not exist. It has been proposed that they may be due to defective fusion of the muscle coats of the two sides at the median line posteriorly.

Maylard thinks that diverticula of the cervical portion of the esophagus may be due to the lack of complete obliteration of the brachial clefts.

The pharyngo-esophageal diverticulum is a clinical entity. It in no way resembles diverticula at other portions of the esophagus and it is entirely unlike the fusiform dilatation above a stricture. It is unfortunate that the pharyngo-esophageal diverticulum is classified with the other diverticula.

Pulsion pharyngo-esophageal diverticula are produced in a very definite way and they are always to be found in the same location. There is a definite anatomical background, and in this respect they differ from all other diverticula of the esophagus.

The portion of esophagus where this condition occurs has been called the Lannie-Hackerman area, and it has also been called the esophageal dimple. It is at the narrowest portion of the esophagus. Here, at the pharyngo-esophageal junction on its posterior surface, the outer longitudinal muscle coat of the esophagus splits into vertical bundles, which pass around the esophagus and are attached anteriorly on the median raphe of the body of the cricoid cartilage. Where this divergence of the muscle occurs there is left a triangular open space and this space is covered only by circular muscle fibers, and it is in this space that the diverticulum is formed. The space is often referred to as Laimey's triangle.

The anatomical physiology of this portion of the esophagus is given by Jackson.

"The most important etiological factor in the production of pulsion diverticula at the pharyngo-esophageal junction is spasm of the cricopharyngeus muscle, which normally pulls the cricoid cartilage back against the spine, maintaining a tonic closure of the esophageal mouth.

"When the cricopharyngeus fails to relax at the approach of the bolus of food forced downward by the contraction of the inferior constrictor muscle of

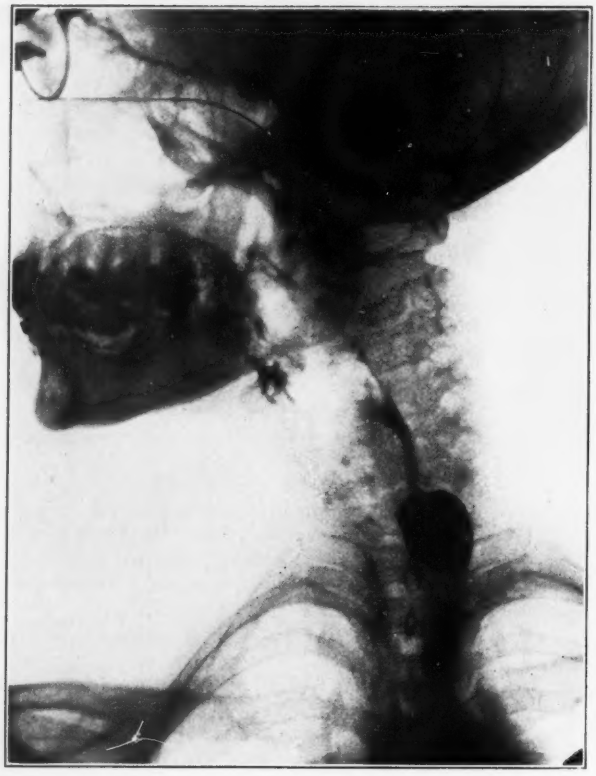

Fig. 3—Shows the diverticulum posterior to the esophagus. If the print is examined closely, a thin stream of barium can be seen pouring over the top of the diverticulum into the esophagus, which is anterior.

the pharynx, this triangular space is forced out to form a pouch. . . . . This barrier presented to the advance of the bolus of food by the unrelaxed cricopharyngeus muscle is the functional factor that herniates the pharyngeal wall."

He seems to think that this is a much more important causative factor than any anatomical weakening of the wall.

The pulsion pharyngo-esophageal diverticulum is a true hernia, as it consists of the mucous and the submucous coats and connective tissue only. It is without muscle fibers.

The diverticulum is pear- or club-shaped and the size varies greatly. It may be quite small, capable of containing only a few cubic centimeters of fluid, or it may be large enough to occupy a considerable portion of the upper mediastinum. Reichman reports a case of such a diverticulum which could contain 500 c. c.

Symptoms.—Many of these patients are treated for throat trouble for a long time before the diverticulum is discovered. They are occasionally found with a probe or bougie and sometimes with the esophagoscope, but they are usually not discovered until an x-ray examination is made.

The principal symptom is gradually increasing difficulty in swallowing and in most cases the progression is very slow. Going over a period of years there is some slight trouble with deglutition. The individual complains that he has to swallow slowly, but finally the time comes when the condition is sufficiently troublesome for him to seek a diagnosis.

In the course of time much difficulty in swallowing develops, eating is accompanied by more or less strangling and a return of some of the food swallowed. Sometimes a few hours after eating there is brought up into the mouth undigested food.

As the pouch gets larger the patient swallows with more and more difficulty. There may be sufficient pressure on the trachea to cause cough and dyspnea, and he eats less, and since he has so much difficulty in swallowing, more by himself.

There is frequently swelling in the left neck which is relieved by massage, or by sagging or vomiting.

There is no pain connected with the condition unless ulceration occurs.

Diagnosis.—When these patients are given a barium emulsion and examined with the fluoroscope the emulsion can be seen to flow into the sac and, when full, to flow over the top of the sac into the esophagus.

There is no difficulty whatever in making a differential diagnosis between diverticulum and stricture. On the screen, in a stricture the emulsion pours in a thin stream from its dependent portion into the esophagus, which is below and in line with it; while in a diverticulum the emulsion flows over the upper edge of

the sac into the esophagus, and the diverticulum can be easily seen to be out of line with or to the side of the sac.

Films can be made on the fluoroscope screen, or if one prefers to make them in the prone position, the patient can be given a barium acacia mixture which is more viscid and will not so readily flow out of the sac.

Carman suggested as an aid to x-ray diagnosis the introduction of an opaque bougie into the esophageal lumen to show better the relation of the sac to the esophagus.

Plummer suggests passing the bougie over a guiding thread which has been previously swallowed.

Sounds or probes will always pass into the pouch if not guided, as the opening to the pouch is on the posterior wall of the esophagus, so the introduction of a sound without a guide is a dangerous procedure which may result seriously for the patient.

Arrowsmith calls attention to the great value of Mosher's ballooning esophagoscope.

In some of the advanced cases in which there is great interference with swallowing there is emaciation and a picture is presented not unlike malignancy of the esophagus or throat.

The x-ray is less dangerous and more satisfactory than any other means of diagnosis.

Prognosis.—The treatment is surgical and the prognosis is good with operation in skilled hands. Operations upon nearly two hundred cases have been reported. Lahey reports operating upon thirteen cases with no mortality. Judd reports fifty-three cases operated upon at the Mayo Clinic with three deaths.

Treatment.—Mosher proposes a method of treating the pharyngeo-esophageal diverticulum by cutting the common wall between the pouch and esophagus through the esophagoscope. He reports several cases successfully treated in this way. Few have the required skill to perform such an operation.

The usual method is to dissect out the sac through an external incision. The sac is usually extirpated and the operation is done in one or two stages. There is danger in the one-stage operation, as infection may pass down the anterior surface of the vertebra into the mediastinum, and infection of the mediastinum is more deadly than peritonitis.

The two-stage operation as devised by Charles Mayo is, with most surgeons, I believe, the operation of choice. However, the one-stage operation has its advocates. Shallow says:

"The one-stage operation offers the best possibility for permanent repair because in the two-stage operation the repair is made in much inflammatory tissue. The two-stage operation is somewhat safer, but far less apt to effect a permanent cure."

He suggests using a Rehfuss tube passed through the nose for post-operative feeding.

Lahey recommends the two-stage operation and advises the use of local anesthesia to prevent regurgitation of fluid into the trachea with resultant suffocation or the development of broncho-pneumonia. Murphy preferred the two-stage operation.

Some cases, not far advanced, will live in fair comfort by careful attention to diet.

I wish to report the following case:

A white woman, age 55 years, height 48 centimeters (4 feet 10½ inches), weighed 50 kilograms (110 pounds), which had been her weight for some years.

There is nothing of interest in her family or past history, except as the past history relates to her present complaint.

She has a hypertensive arteriosclerosis.

Of her present complaint, she says, for several years she has noticed something wrong with her throat. If she ate fast there was a stoppage, or in some way, an interference with swallowing, but it gave her very little trouble until eight months before I saw her, when it became necessary to wash her food down with water. She is nervous and has been much worried about her condition, fearing cancer.

Fluoroscopic examination of her chest was negative except for cardiac hypertrophy. When she began swallowing a barium emulsion the diagnosis of pulsion pharyngo-esophageal diverticulum was easily made. The pocket was situated opposite the seventh cervical vertebra, just above the articulation of the first rib. It filled immediately with the emulsion and, when full, the emulsion ran over the upper edge into the esophagus, which was out of line with it. The pouch was on the left side and posterior. The sac moved up and down freely with the esophagus in swallowing, which made it plain that it was distinctly a part of the esophagus and was not adherent to any surrounding structure. On the screen the sac measured about 1 by 1.5 cm. Its lower dependent portion was rounded and of even contour. The esophagus below this point was normal and the stomach was normal. Later the patient was given an acacia barium mixture and films were made in the prone position; prints made from these films are being shown. If they are examined closely the barium can be seen flowing over the mouth of the sac into the esophagus.

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MOSES AND THE PUBLIC HEALTH*

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The saying attributed to Solomon that "there is nothing new under the sun" may not be literally true in all divisions of human endeavor, but it appears to be a fact with the principles underlying the relation of man to man.

As a specialist in the public health aspect of medicine, the most human of all sciences, my interest has been greatly engaged in its history. The most ancient writing with which I am acquainted that deals with the subject is found in the book (or collection of books) from which the above quotation was taken, namely, the Old Testament, and the author (or scribe) is that most remarkable Hebrew genius and leader, Moses.

Whether or not one holds the current orthodox view that God Almighty delivered the ancient Hebrew code of laws in person to Moses on Mt. Sinai, as recorded in the Pentateuch, he cannot, if he is at all versed in modern medical or social science, help being struck with the race-preserving wisdom that prompted much of the detail of that law.

New discoveries in the causation of disease have now demonstrated scientifically that the detailed and universal observance today of the principles underlying certain of the rules laid down for the children of Israel, approximately 1,500 years before Christ, will promote health, banish every infectious disease, increase longevity and release in innumerable ways the innate possibilities of the human race.

Some of these rules are most crude in the application of the principles they exemplify, and others give reasons for their observance more religious than scientific, but the fact is clear that whatever their origin, obedience to them will truly bring physical salvation to man. Under them man individually is shown how to live healthily and happily, and as a race how he may eventually reach his full statue as a son of God indeed.

Moses.—The man Moses, who promulgated this code, you will remember, was the son of parents belonging to a nomadic desert tribe that, though enslaved for generations, had yet kept itself free in the main from the taint of blood inherent in marital union with the Egyptians, a nation whose lascivious religious and social practices invited racial degeneration. This freedom from the ill-effects of intermingling, however, may have been due in part to Israelitish enslavement and segregation, since Moses, himself a member of the royal household, did not practice separation and married an outsider.

The romantic story of Moses is familiar to all. Adopted by the daughter of the Emperor, he was trained in all the wisdom of Egypt, the most cultured nation on earth. His status as prince, and as son-in-law to one of the chief priests in the temple of the Sun God, gave him access to the greatest depository of ancient learning existent, and to all the secret knowledge and mysteries zealously guarded by the priests, the only medical men of that time. We have the

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best of evidence that he made the most of his opportunities.

When the responsibility of leading and guiding the destinies of an undisciplined horde of freedmen and their families fell upon Moses, he utilized to the full every talent he possessed and drew exhaustively upon the store of wisdom and knowledge he had accumulated, recording carefully and in detail the results of his thought and then proclaimed the result as God-given truth. After thirty-five centuries we are bound to agree with him.

Eugenics.—Moses' problem was to build a nation, so the most important edict promulgated by him was a drastic racial integrity law designed to insure a healthy, vigorous race. He prohibited under pain of death the current Egyptian practice of marriage and sexual relationship within the family circle. He went even further and prohibited any marriage except with a virgin.

"A widow or divorced woman or an harlot shall ye not take" (Lev. 21:14). "Neither shall there be a whore of the daughters of Israel nor a Sodomite of the sons of Israel."

Who will doubt the great public health and race conserving quality inherent in these regulations, however impractical their enforcement in detail would be today?

Moses apparently was a crank on the subject of a sound and healthy inheritance, not permitting even the broken-footed, broken-handed or the crooked-backed, flat-nosed or the dwarfed or one who had a tumor on his body or a blemish in his eye, or who had an eruption, or was scabbed or "hath his stones broken" to come near the altar of God. In other words, he put the highest premium he could think of upon healthy marriage and penalized and discouraged the union of those who might bring into the world offspring burdened with physical defects. To that end he made the Hebrew tradition and practice a matter of law and prohibited marriage with the nations round about, of whose hereditary weaknesses he knew nothing but suspected much.

It would seem that it is almost time the medical profession caught up with Moses, at least in spirit, and began to stress heredity in greater degree than is now done as a factor in developing a healthy citizenship. The correction of defects and the cure of disease has perforce occupied the major portion of the physician's time and thought, but there is much that has been learned in the science of eugenics since Moses outlined its principles, and there is much the family physician may do in instructing his clientele concerning the laws underlying heredity and in the fundamental necessity of the possession of untainted blood as a prerequisite to good health and bodily vigor in the individual and in his offspring.*

So much for the ancient medical and social principle of a clean heredity as promulgated by Moses.

Sanitation.—To Moses is also due the first record of the principle of environmental sanitation, the scientific basis of which has been discovered only in the past fifty years. In Deuteronomy 23:12-13 the command is given:

"Thou shall have a place without the camp whither thou shalt go forth abroad, and thou shalt have a paddle among thy weapons, and it shall be when thou wilt ease thyself abroad, thou shalt dig therewith and shalt turn back and cover that which cometh from thee."

The sanitary disposal of human wastes is, as we all now know, the greatest single item in any program for insuring the healthfulness of human society.

Approximately one thousand years after Moses' time the great Hippocrates, as will be mentioned later, paid his respects to environment as a causative factor in disease. Does it not seem that the interest of the general practitioner of today should be more deeply engaged in this important matter than appears now to be the case?

Typhoid fever, dysentery, diarrhea, intestinal parasites and, perhaps, poliomyelitis are all spread by neglect of this Mosaic precept. Can the true physician really justify his inaction in not insisting at every home to which he is called that there be a sanitary method of sewage disposal, properly installed? Not to do so is to invite a repetition of many of the diseases he is called upon to treat.

Segregation.—To the law giver of Israel we also owe the first recorded intimation that eruptions upon the skin may indicate a serious infectious condition, a so-called leprosy. In Leviticus 13 we note: "When a man shall have in his skin a rising, a scab or bright spot, he shall be brought to the priest" for diagnosis. If, following a formula prescribed, the priest thinks

*Apropos of the above remark, I commend to you Alfred Edward Wiggam's "New Decalogue of Science," particularly the first and sixth commandments there given.

the man infectious, he will shut him up seven days, and then another and another seven days if conditions warrant. All through the chapter we have very effective, even if they are primitive, methods of diagnosis and quarantine applied to the skin troubles so very prevalent then as now in that southern clime.

Surely with this example and with our superior knowledge, we should be able to prevent a recurrence of skin infections. The methods of disinfection consisted in the application of plenty of water and time to the patient, and burning of garments and bedding or, in certain instances, of washing several times in water. In regard to the house in which the sick one lived, it was at times directed to be torn down or, in certain cases, the walls were directed to be scraped or plastered. Along with these precautions went certain ceremonial religious observances, very much as we now countenance and perhaps advise fumigation after we have demanded and secured a thoroughgoing clean-up.

Venereal Disease Control.—To Moses is also due the first recorded application of the principle of segregation to those suffering from gonorrhea and syphilis. We have account of a rigid quarantine established against these diseases, now almost universally ignored in their infectious aspects, which yet are not only contagious but, as Osler says of the coccus of Neisser, "As a misery producer it is a king among germs."

Let me quote from Leviticus 15:

"When any man hath a running issue out of his flesh, because of his issue he is unclean, every bed whereon he lieth is unclean, and everything whereon he sitteth is unclean, and whosoever toucheth his bed and he that sitteth on anything whereon he that hath the issue hath sat, and he that toucheth the flesh of him that hath the issue, shall wash his clothes and bathe himself in water and be unclean until evening.

"And when he that hath an issue is cleansed, then he shall number to himself seven days for his cleansing and wash his clothes and bathe himself in running water, and he shall be clean."

Here again it would seem that we shall have to go a long way if we wish to overtake Moses; while perhaps we may with perfect propriety cast some doubts upon the effectiveness of the machinery and methods by which the Mosaic quarantine and disinfection law was enforced, we are bound to admit that the publicity given to the matter, and the drastic steps taken when evidence that the law was being violated was presented, tended to create a very wholesome respect for the law. It well may be that a similar plan under scientific direction and in the modern spirit may enable the present generation of physicians and public health men to deal more adequately with the great unsolved problem of venereal disease control. Free state board of health literature on the subject is available and every physician should be a distributor of it.

Animal Disease Carriers.—Control of bubonic plague and tularemia was insured under the Mosaic law (Lev. 11) by the decree that all rodents shall be considered unclean. Those named specifically were the weasel, the mouse, the ferret, the mole, the coney (a kind of ground squirrel), and the hare. It was even forbidden to touch these animals when they were dead under penalty of a one-day quarantine. We have a description in first Samuel (chapter 5), where the Philistines, whose land was overrun with mice, suffered greatly from the plague (emerods, the disease was called). Their affliction was attributed by their priests to the fact that the Hebrews' sacred "Ark" was in their possession. So they made imitations in gold of five bubonic tumors ("emerods") and the images of five golden mice and placed them in a coffer as a trespass offering and sent them with the Ark back home. This device seemed to them effective for the Philistines' plague abated, as even the worst plagues have a way of doing. We have no account in the Bible of the Israelites ever suffering from anything resembling bubonic plague. Rodents and other small fur-bearing animals being unclean as well as destructive were not tolerated in their land, and the diseases due to parasites that infest them had small opportunity of being communicated to the inhabitants.

It may be that physicians have been neglectful of their duty in imparting a knowledge of the potential dangers of the rat flea and other parasites to those whom they serve. It is certain that unless these matters are discussed in all their bearings with their patrons, when calamity comes in the form of pestilence the physician cannot be absolved of responsibility.

The well known Mosaic regulation against eating pork will occur to many of you as having a distinct public health significance. Fuel was very scarce in the desert and in Palestine raw and half-cooked food was probably the rule rather than the exception with the Hebrews. The taboo against the pig not only insured against trichinosis, but kept the camp free from that abominable, smelly, fly-breeding nuisance,

the hog pen, from which many of our towns and villages suffer today. In Deuteronomy, chapter 28, verses 21, 22, 27, is recorded that the violation of the law will cause

"Jehovah to make pestilence cleave unto thee. He will smite thee with consumption and with fever, with inflammation and with fiery heat. He will smite thee with the boil of Egypt, with the emerods and with the itch."

We physicians know more about specific cause now than Moses did. The duty, therefore, is imperative upon us more fully to impart what we know to those who invite pestilence because of ignorance which we alone can dissipate.

Hippocrates' Endorsement.—Not to weary you with further examples of Mosaic public health practice, for there is much more, let me turn the pages forward a thousand years. The golden age of Greece about 460 years before Christ saw the birth of the great Hippocrates, whom the modern profession of medicine is glad to own as its father and founder.

To this wonderfully honest physician, research worker, author and gentleman, medicine owes its dignity and its standing before the world today. At another time and place I expect to go more fully into Hippocrates' contribution to modern medicine. However, there are a few observations and principles made by him which buttress the more ancient items just given, and which I am persuaded will have greater weight with a medical audience than anything Moses might say. In one of Hippocrates' famous "Aphorisms" he makes this statement:

"The physician must not only be prepared to do what is right himself, but also to make (1) the patient, (2) the attendants and (3) the environment cooperate."

I submit that the third item in this summary is as important as the other two and if neglected breaks the technic of proper practice as much as if the surgeon had conducted a completely aseptic operation and yet made no provision for subsequent dressing and after-care of the patient.

To make patient and nurses obey orders as to medicine, food, baths, in a case of typhoid fever, and not to screen the sick room against flies, or not to see that there is a sanitary arrangement for the disposal of the excreta of the patient and household is, I submit, sloppy practice, which the principles of neither Moses nor Hippocrates countenance. The environment of a patient must in proper practice, in all cases possible, be made to cooperate.

Prevention.—In Hippocrates' famous treatise on "Air, Water and Places," he definitely establishes the status of the physician as a preventer of disease when he states that the physician

"must proceed to investigate, and he cannot miss knowing, the diseases peculiar to his locality. In particular he can tell as the season advances what epidemic diseases are to be expected, and being acquainted with each particular he must succeed in the preservation of health and in the practice of his art."

The modern physician might conceivably reject Moses' public health efforts on the ground that he was a priest and an irregular, but when Hippocrates, our great exemplar, prophet and law giver, places preservation of health ahead of the practice of his art, we must attend him.

Let us move forward again, this time only 500 years or thereabouts, to a province east of Hippocrates' birthplace, and as the crow flies only 200 miles away, and hear the Man of Nazareth state that "greater works" than He performed would be possible in the days ahead. What greater works, may I ask, could be performed than the miracles of healing attributed to him? The blind saw, the deaf heard, the lame walked, the lepers were cleansed, and even the dead are said to have returned to earth. These wonders, with the exception of the last, are duplicated daily by the modern physician in countless hospitals and in private practice over the length and breadth of the land and nowhere except in one domain can greater work for humanity be found, and this is in the realm of prevention. To prevent blindness, deafness, lameness, leprosy and every other preventable condition is infinitely preferable to working a cure, and to prevent premature death in all its manifold forms is truly a divine function.

In this latter time to us, the medical profession, is given to know the scientific basis for the calamity of disease and disability. It is our glory that in our profession is the ethical principle, in our minds the knowledge, in our hands the skill, and in our hearts the will to conquer the disease curse of the human race.

Let us, then, more carefully follow in the footsteps of the ancients where they point the way, applying to the crude foreshadowings of a primitive age the scientific background we now possess, together with the more perfect method and the wealth of experience upon which we now may draw.

Preventive medicine is not simply a specialty of our "Noble Art," but a sacred principle that pervades it throughout. Every true son of Hippocrates, every admirer of Moses, every follower of the Christ, must consciously at every turn apply this principle or repudiate the very spirit in our profession that has earned us the approval of mankind.

IMPROVED PENIS CLAMP*

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The retention of fluids, or material oleaginous or mucilaginous in nature, in the male urethra for the purpose of local anesthetization, for combating infection, or for the treatment of other morbid conditions is, of course, an old accepted method. Recently, however, it is being recognized that in the treatment of most cases of gonococcal infections of the anterior urethra, acute or chronic, the prolonged retention of medicaments under moderate distention in the urethra is desirable. Various means have been recommended from time to time to accomplish this end: the plugging of the urethra with cotton, the application of collodion, but more recently the introduction of the urethral clamp. Several types of these instruments have been marketed. However, the objections to them have been essentially either their tendency to slip off the glans penis, especially with the patient in the standing position, or the objectionable pinching effect which often gives the sensation of numbness, or they are cumbersome and too weighty for practical application.

Although this device is simple and serviceable, its usefulness in specific urethritis, except perhaps by a few specialists, has been overlooked. It has been limited largely to office practice, while patients for whom home treatment is prescribed must depend upon their own ingenuity for injecting and retaining medicine. The incompetency of the rank and file of patients, more especially the youthful ones, in administering and retaining their home treatment effectively, is only too well known to those who are engaged in the venereal subdivision of urology. The complaint of cramping of the fingers, the changing from one hand to the other, the restlessness and carelessness of patients permitting the slow escape of the injection fluid is certainly responsible, in a number of instances, for defective treatment which thus encourages possible complications and an indefinite prolongation of the infection. Yet a countless number of men today are still simply advised to use home remedies. Comparatively few are instructed intelligently regarding their use while fewer still actually inject and retain their injection fluids effectively.

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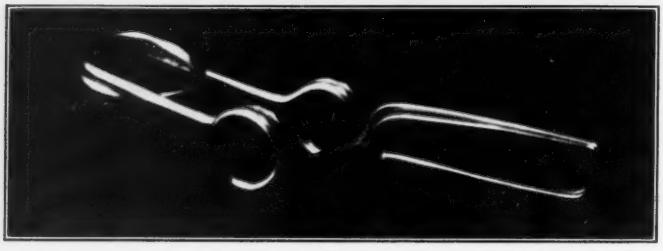

Fig. 1

Fig. 2

The clamp recommended herewith represents perhaps the most improved and convenient method for occluding the meatus. It is not only ideal for office practice, but may be used with safety by patients for home treatment. The idea of the clamp has been a source of comment and approval by our patients who are impressed with the ease and simplicity which it gives their home treatment.

The clamp (*Fig. 1*) is made of non-corrodable, flexible wire, which may be thoroughly sterilized and bent, so that the spring effect may be adjusted to almost any desired intensity. The part that is placed over the glans penis, in order to occlude the meatus, is elongated and flattened, eliminating pinching and numbness. The clamp may be used directly over the skin (*Fig. 2*) or preferably over a film of cotton. Being made of light wire, small in size, convenient to manipulate, it offers an inexpensive, practical and serviceable little instrument for general use.

CHRONIC DUODENITIS*

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The first history-making efforts to study duodenal function and disease appear to have been those of Einhorn, Gross, Hemmeter and Kuhn in the final decade of the last Century, when each originated a duodenal tube, and laid the foundation for much of the duodenal and gall bladder work of recent years.

In 1910, Einhorn[1] published an article on the diagnosis of chronic duodenitis by the symptoms and the aspirated duodenal contents. In the same year Gaultier published his book on "The Diseases of the Duodenum and Their Treatment." In 1911, Gross[2] wrote on duodenitis and reported results with the tube. He called attention to the inflammation, often hemorrhagic, which the duodenum shows after extensive skin burns, thus illustrating its quick response to toxemia. Gross called the first portion of the duodenum the "transition link" of the digestive tract, and this function plays an important part in the present discussion. He referred to the light thrown on duodenitis by Hunter, Moynham, W. J. Mayo, Chvostek, Munro and Codman by their studies on ulcer. All of the clinical work on duodenitis up to that time was apparently on acute conditions, associated with catarrhal jaundice, and on chronic catarrhal states, diagnosed by symptoms and the aspiration of mucus, though surgery and autopsies were beginning to demonstrate a close relationship between chronic duodenitis and duodenal ulcer.

The Quarterly Cumulative Index lists only six papers on duodenitis since 1917; four of the six were published this year; three of the six were by American authors. To contradict this apparent lack of interest in the subject, most articles on ulcer carry some mention of duodenitis, and in the last few years many x-ray men are trying to differentiate the two in their diagnoses.

The work of McCarty, W. J. Mayo, Judd and Nagel,[3] Konjetzny and others has thrown much light on the pathology of duodenitis. Konjetzny finds chronic gastritis or duodenitis in practically every case of gastric or duodenal ulcer, and considers the chronic inflammation the cause of the ulcer. In this view he is supported by many, though Hauser[4] and a large group believe the ulcer to be a primary condition.

The data at present obtainable from the literature is based largely on cases proven to be duodenitis at the operating or post-mortem table, and while such information is admittedly most accurate, it is not sufficient for general purposes. Most of the authors to date insist that duodenitis is a surgical condition, and of course are even more surgically inclined in regard to definite ulcer. The writer contests this stand on three premises: first, the mortality rate of gastro-duodenal surgery in the best of hands is twice as great as the perforating rate in treated ulcers; second, the physician has no greater burden to carry than the futile treatment of the frequent surgical wrecks in these cases; third, to classify such a condition as surgical is to nullify any real progress in the study of its true etiology, and makes for half-hearted diagnostic effort. Let us remember that our surgical authors cannot, in proper modesty, state another truth in this connection, namely, that only a small percentage of surgeons are qualified to undertake such operations, though the larger group, in following their teaching, will do the major portion of the work.

The human duodenum, in its anatomy and physiology, is peculiarly predisposed to inflammation. In its first and second portions, the acid contents of the stomach meet the alkaline bile, and when we consider the numberless artificial elements in the average diet, it is conservative to say that the mucosa of the duodenum is punished by more varied chemicals than any other tissue in the body. Alcohol, especially, is poorly tolerated by the duodenum, and after a drinking bout many individuals will show a widespread congestion, giving occult blood in the stool and frank blood in the gastric contents.

In the author's opinion, many cases of duodenitis are caused by the indiscriminate use of cathartics, many of which produce their first and strongest effect in the first portion of the duodenum. I have had many cases of duodenitis showing marked improvement which suddenly went backward from a saline purge.

Much is seen in current literature of arterio-mesenteric occlusion of the duodenum, where the root of the mesentery, dragged down by viceroptosis, presses on the duodeno-jejunal junction, but only a few authors have discussed the more frequent and I believe more potent occlusions on the right side. Here we have two sites

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of constriction, at the junction of the first and second portions, and at the junction of the second and third. In marked ptosis of the stomach there may be a proportionate dropping of the entire first and second duodenal segments, often causing a kink where the tube starts under the peritoneum. If the duodeno-hepatic ligament holds, there is an elongation with resultant atony[5] of the first portion, or if the ligament gives away, except at one point, which frequently happens, we have a loss of the normal crescentic curve, and find acute angulation added to the elongation. All of these conditions cause stagnation, toxicity, and, at times, chronic infection of the mucosa. The gastric atony and ptosis also destroy the hydrostatic pressure normally present and gravity's aid in emptying the stomach is lost. The resultant gastric retention and fermentation puts still another load on the duodenum.

Chronic gastritis, by extension and by causing faulty digestion, may produce duodenitis, while the frequent association of chronic duodenitis with gall bladder conditions would suggest that either can cause the other. In the author's experience, the chronic dyspepsia so constant in gall bladder cases has usually turned out to be a duodenitis, and the clearing up of the latter makes easy the diagnosis of the next gall bladder attack.

A high percentage of tuberculous patients show a clinical and x-ray picture of duodenitis, many having the first symptoms after starting the heavy diet usually prescribed. Some of these are apparently typical cases, the inflammation being caused by forcing more food through the stomach than it can digest. In others the duodenitis is only the symptom producing part of a generalized entero-colitis. These cases have responded less satisfactorily to treatment than any other group I have studied.

Intestinal parasites play their part, and in the South, hookworm is a frequent offender. While my duodenitis series showed only 3 per cent caused by this parasite, my hookworm series of twenty-odd cases (all adults) showed x-ray evidence of duodenitis or ulcer in practically every case. One of these had had five laparotomies in an energetic effort to relieve the symptoms.

The role of focal infection has been well worked out on experimental animals, its occurrence in humans being so frequent as to make useless any effort to estimate its potency as a causative factor.

In his paper on this subject Roeder[6] called attention to the fact that the duodenum can become inflamed or infected by way of the lymphatic system from the appendix, gall bladder and liver. It is noticeable that many cases of appendicitis show a duodenitis; and in my opinion many of the pylorospasms attributed to reflex from the vermiform are due directly to the irritable duodenum. In these cases, as in those of gall bladder disease, treatment of the duodenum often clears the diagnosis by removing the secondary dyspepsia and leaves only the previously overshadowed symptoms at the actual site of trouble.

Many authorities claim it impossible, or impracticable, to diagnose duodenitis pre-operatively, but such a stand, while all right for the surgeon, is not conducive to progress for the internist. Also, it would seem less harmful to call a small percentage of non-scarring ulcers by the name of duodenitis than to class all irritated and inflamed duodena as ulcers. The physician has another obligation in this connection, namely, insurance reports. A carelessly made diagnosis of ulcer will forever blast a patient's chance to get life insurance, and since much observation has shown that few cases of duodenitis will become ulcerative under treatment, some discrimination should be used.

In gathering data for this paper two hundred successive diagnoses of duodenal abnormality were analyzed. The differentiation between duodenitis and ulcer was based entirely on the fluoroscopic and serial plate study. A defect found constant on all studies was called ulcer. A tender, reluctantly filling and rapidly emptying duodenum, with irregular spasmodic contractions which could be overcome by slight pressure, was classed as duodenitis. Most of the cases were repeatedly re-examined as a check on both diagnosis and treatment, and in only two was the first diagnosis reversed. The summary follows:

Ulcer	82
Duodenitis	91
Diverticulum of first part	1
Diverticulum of second part	3
Hernia of pylorus and first part of duodenum into left thorax	1
Dilation of bulb	16
Stasis in second part	3
Stasis in third part	2

The average age of the 91 duodenitis cases was 33; average for ulcer group, 40.

Duration of symptoms in the duodenitis group

averaged 3 years and 9 months; in the ulcer group, 6 years and 1 month.

Gastric analysis on 77 duodenitis cases and 56 ulcer cases showed the following:

	Duodenitis	%	Ulcer	%
Achylia	3	4	2	3½
Subacidity	11	14	5	9
Normal	25	30	9	16
Hyperchlorhydria	16	20	10	18
Hypersecretion (all)	16	20	28	50
Hypersecretion acid	8	10	17	30
Hypersecretion normal	4	5	4	7
Hypersecretion subacid	4	5	7	12
Catarrh (all)	8	10	4	7
Catarrh acid	1	1	....	....
Catarrh normal acid	1	1	4	7
Catarrh subacid	4	5	....	....

The Einhorn string test was positive in equal ratio in the two groups, about 40 per cent.

Tuberculosis was diagnosed in 19 per cent of the duodenitis group, and in 10 per cent of the ulcer group. In most of these the tuberculosis was of the "latent" type, diagnosed only by repeated examinations and careful study. I am convinced that did we not tend to stop our real examination with a positive diagnosis of tuberculosis many more cases of mixed disease would be reported. I know of no class of patients who more earnestly need a careful gastro-intestinal study than those suffering with phthisis.

A further analysis of the duodenitis group alone showed:

	Cases
High fixation of the duodenum with acute angulation	8
Constipation	40
Diarrhea	6
Gastric atony	4
Ptosis	4
Atony and ptosis	12
Total atony and ptosis	20
Cardio-vascular-renal disease	17
Vascular hypotension (over 50 per cent)	48
High blood pressure	7
Normal	36
Diagnosis of chronic appendicitis	12
Gall bladder disease	4
History of appendectomy	18
Adhesions around cecum after operation	8
History of pyloroplasty	1
Unclassified fungus in colon	1
Hookworm	3

Duodenitis being a pre-ulcerative state of the mucosa, it is to be expected that the symptoms caused would be identical with those of the more advanced lesion. In my experience the only difference has been a lack of the periodicity common in the ulcer.

The treatment of duodenitis should cover all known pathological conditions, both organic and functional. We are dealing with a narrow, inflamed tube, in a state of constant spasm, and since we cannot prevent the forcing of contents through the gut, every effort should be made to reduce trauma by relaxing the spasm and softening the chyme. Belladonna is used as a routine in my cases, the other drugs recommended being bismuth and alkalis as indicated. All roughage and chemical irritation should be removed from the diet, and when possible an ulcer regime should be instituted. Alcohol and carbonated drinks should be prohibited, and tobacco rigidly restricted.

Correction of gastroptosis by adhesive strapping or abdominal supports, lying down after meals and forced upbuilding of weight is often essential. Diemer[7] puts much importance on mechanics, both in etiology and treatment. I believe the future holds much work for the duodenal tube in the feeding of these cases.

Since our knowledge of the etiology is still somewhat speculative, care should be taken to remove all possible adverse factors, and especially when the improvement under treatment is unsatisfactory should we institute a new search for hidden trouble.

I am convinced that the most frequent causes of failure in the medical treatment of these cases, as well as of ulcers, are too much routine and too little reason and hard work, by both physician and patient.

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DISCUSSION (*Abstract*)

Dr. C. W. Dowden, Louisville, Ky.—There has been considerable disagreement in the recent literature regarding the etiology and treatment of this condition, as well as the nomenclature. The question has arisen of whether it is surgical or medical, an entity or a secondary condition.

It has been shown that nausea and related symptoms are elicited by duodenal stimulation. Second, stimulation of the duodenum inhibits tonus and contraction of the empty stomach. Third, stimulation of the duode-

num produces anti-peristalsis. These three facts furnish us with a good working basis.

If the pathological condition is due to obstruction, the treatment would probably be surgical, and otherwise medical. If surgical, what is the nature of the obstruction? Is it of congenital origin? Is it due to adhesions of infectious origin or following operative procedures? In the latter case, the symptoms are likely to be those of disease of organs to which it is attached. Is it due to insertion of the root of the mesentery where the superior mesenteric artery crosses the duodenum? Other conditions favoring obstruction are the low position of the duodenum, particularly in women, the heavy mesentery, spinal deformity and excessive motility of the proximal colon, dilated cecum, visceroptosis and lax abdominal walls.

If not obstructive, what is the nature of the stimulus which excites peristalsis? Is it chemical or parasitic? Is it neuromuscular through the celiac axis of the sympathetic, in which case the entire endocrin system may be implicated?

Any condition that will permit an accumulation of barium at any point along the course of the duodenum with subsequent distention of that viscus is sufficient to excite the musculature to anti-peristalsis. The symptoms are naturally common to all forms whether obstructive or not and apparently depend largely upon anti-peristalsis, which naturally varies in degree. The degree of pain is probably dependent upon the tonicity of the pyloric sphincter. If this is maintained, there is little vomiting, since there is no regurgitation into the stomach, but pressure on the pylorus produces pain. After the pylorus is dilated, regurgitation occurs, vomiting follows and there is little pain.

Aside from the gastro-intestinal symptoms associated with this condition, I have been convinced, both from my own experience and the experience of others, that certain types of so-called migraine can be relieved surgically where the obstructive type is demonstrable. The operation has consisted of a duodeno-jejunostomy in these cases and frequently such non-surgical procedures as posture, properly applied pads, duodenal drainage and high carbohydrate diet have proven to be helpful.

Certain forms of purpura, sea-sickness and various types of epilepsy at times are unquestionably influenced by this condition. The diagnosis depends largely upon the history and careful x-ray study. Physical examination and laboratory procedures are of very little value.

Dr. G. C. Mizell, Atlanta, Ga.—In function and location the duodenum is unique in the animal organism. Its place of residence is surrounded on every side by vital, active structures and its known functions are both numerous and varied. It is known to be influenced by disturbances in most remote organs, as well as by diseases in those closely associated with it physiologically and anatomically, all of which goes to make interpretation of evidence of disease extremely difficult.

In the series studied by Nagel, mentioned by Dr. Johnson, all of which came to operation, the x-ray did not distinguish duodenitis from ulcer.

Physical examination may give tenderness over the bulb, but so does indurated ulcer. The duodenal tube may give inflammatory products, that is, bacteria, mucus and blood, but these may come from the hepatic system or stomach. Even a therapeutic test, that is, relief afforded or an aggravation of symptoms produced by some treatment, is not conclusive. Thus it appears that until we have more accurate methods of diagnosis and until we can differentiate between primary and secondary disease of the duodenum, and particularly the degree of disease, we must feel our way to the method of treatment.

There are several points of interest which Dr. Johnson merely mentioned that I am sure he would like to elaborate and discuss if time would permit: first, the age of incidence in his series in both ulcer and duodenitis is ten years younger than in groups heretofore reported; second, the large incidence of tuberculosis, 20 per cent, in his duodenitis group; third, his interpretation of the presence of hypotension in 50 per cent of his cases; fourth, he would probably like to say more in regard to treatment.

Those of us who heard Dr. Graham yesterday on gall bladder were deeply impressed and will be enabled to take the very short step which connects infections in the gastro-intestinal tract. We can now see more clearly what has heretofore been suggested to us by clinical observation, namely: the close relationship in disease of one part of the gastro-intestinal tract with that in another part. Our vision is becoming broader and processes of interpretation are made more trustworthy. Dr. Johnson has mentioned the importance of treating all associated diseased conditions. Sooner or later we shall agree that duodenitis for the purpose of treatment will fall into one of three groups: medical, surgical, or medical and surgical.

My first experience with duodenitis was some twenty years ago, while I was associated with the distinguished father of the essayist. The patient, a physician, who refused operation, came to autopsy, which revealed a duodenum that through years of chronic inflammation had contracted so that the lumen of the 6 cm. of the proximal portion was only 0.5 to 1 cm. in diameter. This was clearly a surgical condition. On the other hand, we feel sure that there are many mild cases that undergo spontaneous recovery or recover on medical treatment. Then there are others between the extremes which should be handled in the accepted manner of handling indurated duodenal ulcer, having in mind that in the ulcer of duodenitis there is little or no induration, hence more danger of perforation. Improvement or cure is not difficult to obtain, but difficult to maintain.

Dr. Johnson (closing).—Dr. Dowden spoke of the relation of the nervous system to duodenitis. The data obtained from my series of cases certainly leaves this point open to question, as the 50 per cent of low blood pressures would indicate a vagotonia. Much work has been done lately to demonstrate that peptic ulcer may have a neurogenic origin.

My attitude towards surgical treatment was mainly to combat the stand of our surgical authors who advocate resection of the duodenum for duodenitis. They wish to handle the condition like a gastric malignancy. We cannot distinguish between early carcinoma and gastric ulcer, but cancer of the duodenum does not occur often enough to worry about.

When duodenitis does not respond to treatment it is usually due to the presence of a surgical condition or a more general malady, such as tuberculosis. Certainly, in the former condition, we should operate, but not upon the duodenum.

We should strive to diagnose duodenitis because it plays a part in many conditions. In cardio-vascular and renal diseases, and in other conditions beyond question inoperable, we frequently find a duodenitis causing dyspepsia, and it is only by recognizing the condition that we can give relief.

TULAREMIA: REPORT OF A CASE*

By GORDON HASTINGS, M.D.,†
and
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Tularemia is an acute infectious disease caused by the *Bacterium tularense*. It is primarily an infection of rodents, especially rabbits, but occurs occasionally in man as an accidental infection.

The patient, a well-nourished, well-developed white farmer of 64, summoned a physician prompted by a rather serious illness of approximately three weeks' duration. His temperature had remained alarmingly high and continuous and his relatives, who ascertained no improvement in his general condition, sought the advice of a physician. Because of the continuousness of his illness, typhoid fever or some similar disease carrying a continuous fever and probably contagious was suspected.

The onset of his illness was given as December 7, 1927. At this time the patient stated that he was taken rather suddenly feverish and "out of sorts." He had an aggravating headache, which became progressively worse. He felt as though he had the grippe, but was at a loss to account for such a malady without some accompanying respiratory complication which had previously ushered in his cases of this illness.

He and his relatives suspected a curious disorder never previously experienced by them. His chief complaint was frequent chills associated with profuse sweats, high fever, anorexia and general malaise. His hyperhydrosis was associated with a rather disagreeable fetid odor. He had lost approximately 50 pounds in weight and his appetite was practically nil. Peculiarly, he complained of neither suffering with nausea nor vomiting. His bowels were constipated in spite of the large quantity of 666 consumed over quite a long period for suspected malaria.

On December 27, subsequent to a call paid by a physician, the following information was obtained. A rather complete physical examination proved to be essentially negative except for the left arm. A history of handling rabbits was given. The patient stated that at rather frequent intervals it was his custom to dress these animals subsequently to being offered for sale. At the time of examination he seemed acutely ill and the information as indicated above seems accurate. The following illnesses were suspected: malaria, typhoid, septicemia, anthrax, endocardial disturbances and tularemia. In the respective order of their prevalence differential diagnosis eliminated all but tularemia.

A specimen of blood was collected and immediately forwarded to the hygienic laboratory for examination. A report from this laboratory confirmed the diagnosis. A positive agglutination in high dilution (1-640) was discovered.

The first finger of the left hand on the dorsal aspect between the first and second joint showed a possibly ulcerating papule approaching the size of a dime. There was local induration, tenderness, moderate swelling and redness at the original point of infection. The regional lymph glands were moderately tender and enlarged; an epitrochlear gland had obtained the size of a hen's egg, and the tissue surrounding this gland glistened and was purplish in color. The left axillary glands were also enlarged and associated with remarkable slight tenderness. The index finger subsequently became ulcerated; there was but little weeping and no superimposed pyogenic infection occurred.

The enlarged epitrochlear gland was threatening rupture with possibly suppuration.

While under observation the patient ran a septic temperature, with rather infrequent daily remissions; most frequently, however, an afternoon rise as high as 104°. The patient complained of a decreasing desire for muscular exertion of his left arm along with some aching of the extremity. He complained of pain extending into the left neck.

The period between December 7 and 27 in which the manifestations of the disease were probably at its height unfortunately was not subjected to the observation of a physician.

The patient became, after a rather lengthy siege, slightly improved. His symptoms mitigated as the period of his illness progressed and on January 16 his temperature was reported as normal. The regional lymph glands were obviously but little changed. On January 20 the patient was again examined and the temperature normal. At this time he was permitted to sit up. He had gained considerably in weight and was looking quite improved. His appetite had returned. Even though he was convalescing, his enlarged gland persisted and continued to threaten rupture, which was prevented by a small incision permitting the escape of about three ounces of thick cream-colored pus. The patient made an uneventful recovery.

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EFFECT OF INACTIVATION OF LUETIC SERUMS UPON THE COMPLETENESS AND CLARITY OF ANTIGEN PRECIPITATION AND COMPLEMENT-FIXATION PROCEDURES*†

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The effect of inactivation of serums upon the luetic antibody has been studied and variously discussed by Hecht,[1] Stern,[2] Pinkus,[3] McKenzie,[4] Noguchi,[5] Kolmer,[6] and others. On the basis of the findings of Noguchi and Kolmer, Matz[7] states:

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"The serum should be freed of blood cells and inactivated by heating in a water bath at 55° C. for fifteen minutes. This destroys the natural complement and a minimum amount of the reagin. It is believed that a half hour's inactivation results in too great a destruction of the Wassermann reacting bodies."

Since the object of the Bulletin referred to is the standardization of laboratory work in the hospitals and regional offices of the Bureau, all laboratorians engaged by the Bureau must carry out the inactivation as prescribed in the Bulletin.

In connection with the precipitation procedure, Kahn[8] recommends inactivation of the serum for one-half hour at 56° C. It is evident that if complement-fixation and antigen precipitation procedures are to be carried out on the same blood serum specimens simultaneously, each specimen of serum would have to be divided into two portions and separate inactivations accomplished. In view of the fact that the antigen flocculation test in the laboratory diagnosis of syphilis is gaining recognition, the number of serologists using it in conjunction with the Wassermann reaction is increasing. It becomes desirable, therefore, to so prepare the serum specimens in one step that they may be used in both the complement-fixation and in the antigen precipitation procedures.

A search of the literature failed to show unanimity of opinion as regards the effect of heating on the luetic antibody. This is equally true of the fixation methods and of the precipitation procedures. Thus, opposed to the recommendation of Kahn,[9] Hinton[10] states that in the antigen precipitation reaction for syphilis, serum inactivation is an unnecessary step. To obtain first-hand information on this phase of luetic serology, the following study was made:

Positive serums were inactivated for periods of time ranging from 0 to 120 minutes. Portions of the serums were removed and tested by the cold incubation complement-fixation procedure (MacNeal),[11] and by the antigen precipitation method of Kahn. Extent of fixation was judged by the amount of red blood cells remaining unhemolyzed and was graded from 100.0 per cent (complete fixation) to 0.0 per cent (no fixation). The precipitation results were recorded in accordance with the nomenclature of Kahn. Some of the results obtained are recorded in *Tables 1 and 2* below:

Table 1 shows that fixation of complement is generally less in unheated than in heated serums; that in the 1-5 and 1-10 dilutions a reduction of the fixation occurs only at the end of 120 minutes; that in the 1-25, 1-50, 1-75 and 1-100 dilutions no reduction of fixation occurs at the end of thirty minutes' inactivation; that some reduction of fixation is manifest at the end of 45 minutes; and that no further reduction is demonstrable even at the end of 120 minutes' inactivation at 56° C. The fixation tests with the serums inactivated for thirty min-

TABLE I—Quantitative Complement Fixation in Terms of %

Serum Dilutions	Serum A (Tinted) Time in Minutes									Serum B (Colorless) Time in Minutes								
	0	15	30	45	60	75	90	105	120	0	15	30	45	60	75	90	105	120
1-5	90	100	100	100	100	100	100	100	90	95	100	100	100	100	100	100	100	100
1-10	80	100	100	100	100	100	100	100	75	95	100	100	100	100	100	100	100	95
1-25	75	100	100	75	75	75	50	50	50	90	100	100	100	100	100	100	100	95
1-50	25	50	50	10	10	10	10	10	10	90	100	100	100	100	100	100	100	95
1-75	5	25	25	5	5	5	5	5	5	80	100	100	100	95	95	95	90	90
1-100	5	15	15	5	5	5	5	5	5	75	100	100	90	80	80	80	80	75
1-125	1	5	5	5	5	5	5	5	5	50	75	75	75	50	50	50	50	50
Anticomplementary [Fixation Procedure]																		
1-5	0	0	0	1	5	10	15	15	15	0	0	0	0	0	0	0	0	0

TABLE II—Quantitative Antigen Precipitation (Kahn Technic) in Terms of 1, 2, 3, 4 plus

Serum Dilutions	Serum C (Colorless) Time in Minutes									Serum D (Tinted) Time in Minutes								
	0	15	30	45	60	75	90	105	120	0	15	30	45	60	75	90	105	120
	?	1	4	4	4	4	4	4	4	1	3	4	4	4	4	4	4	4
	?	?	4	4	4	4	4	4	4	1	1	4	4	4	4	4	4	4
	?	?	3	3	3	3	3	3	3	1	1	4	4	4	4	4	4	4
	0	?	2	2	2	2	2	2	2	?	1	3	3	3	3	3	3	3
Anticomplementary (Fixation Procedure)																		
	0	0	0	1	0	0	1	0	0	0	0	0	5	5	10	10	15	15

utes yielded the most complete and definite results:

Kolmer[12] states that

"When complement fixation tests are conducted with an anti-sheep hemolytic system, the reactions with heated sera may be stronger than with unheated sera."

This he speculatively explains as

"due to the destruction or masking of a portion of the natural anti-sheep hemolysin in human serum by heat and a subsequent closer adjustment of the hemolytic system."

A review of part 4 of the work of Kolmer and his collaborators shows that much evidence had been compiled by them supporting the non-destructibility of the Wassermann reacting substances when heated at 55° C. to from 30 to 60 minutes. There is also evidence showing a certain amount of apparent destruction of the reacting substances. However, the authors emphasize the evidence which shows destruction and explain away the experiments which show no destruction and even augmentation of the reaction in the case of the heated serums.

The fact that a readjustment in the serological procedure is able to compensate for the imbalance caused by the heating, bringing the antibody back into play, proves that a temperature of 55° C. exerts some influence upon the colloidal balance prevailing in the serums prior to heating, but does not affect the antibody as a chemical entity. Kolmer[13] sensed this possibility. In the first of his final conclusions he states that

" . . . heating syphilitic sera results in the destruction of a portion of the antibody concerned in the complement fixation test."

In the third conclusion he states that

" . . . the inevitable reduction in the sensitiveness of complement fixation tests with heated sera should be compensated for in a standardized technical procedure."

Thus, in the first part he speaks of destruction of antibody, whereas in the last part he speaks of reduction in sensitiveness. Furthermore, we believe that, if a biochemical force or reagent is destroyed, nothing can compensate for its original influence except homologous replacement. Such replacement, indeed, cannot be accomplished by mere standardization of technical procedures. A reduction of the sensitiveness, of a complex system of reactions, such as are involved in the complement-fixation test, on the other hand, may occur due to heating, through the effect of the heat upon the colloidal balance pre-existing in the serums. This may occur without exerting any actual destructive effect upon the primary reactive complex (antibody). In such instances, compensation through changes in the technic may and indeed does bring the antibody back into action. It is, therefore, considered that inactivation was not causing any destruction of the antibody in the experiments of Kolmer and his collaborators, but that a rearrangement in the protective colloids occurred, which is easily compensated for by a change in the incubation temperature from 37.0° C. to from 5° to 8° C.

Table 2 shows that the unheated serums in the dilutions of 1-5, 1-10, 1-25 and 1-50 yielded indefinite and doubtful precipitation reactions; that inactivation for fifteen minutes failed to bring about more definite precipitation reaction; but that at the end of thirty minutes inactivation the precipitation reaction was well defined in the 1-5 and 1-10 dilutions. This is in

agreement with the findings of Kahn,[14] who states:

"Contrary to the general belief that the substances in weak sera are particularly destructible at 56° C., our experiments have shown that the weaker the serum the more prolonged is the heating at 56° C. required to bring the reaction to apparently full strength."

It is evident, therefore, that in the antigen precipitation as well as in the complement-fixation, no deleterious effects are exerted by heating upon the reacting substances of the blood serums. This is logical when it is considered, as was shown by Levine,[15] that the same substances that are responsible for complement-fixation in luetic serums are also responsible for the phenomenon of alcoholic antigen precipitation; and that antigen precipitation represents merely the first step of complement-fixation, namely, the formation of the antigen-antibody complex.

Check tests for anti-complementary properties appearing due to prolonged heating of the serums showed that slight anti-complementary properties develop in the tinted serums due to chemical change or to precipitation of the hemoglobin present in the serums. It is, therefore, of importance that serum specimens be obtained free from blood cells and as nearly free from hemolysis as is possible.

CONCLUSIONS

The results of the above study indicate that inactivation of positive serums in a water-bath at a temperature of 56° C. for one-half hour does not reduce the effectiveness of either the complement-fixation test or of the antigen precipitation test, qualitatively or quantitatively. On the contrary, the results in either of the serologic procedures become more definite in character and more complete in volume. One inactivation of the serums for one-half hour is, therefore, recommended for both the complement-fixation and antigen precipitation.

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SOME PROBLEMS ENCOUNTERED IN CASES OF PROSTATIC HYPERTROPHY*

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The problem of diagnosis is still one of the most important in urology. A continuation of our studies shows that our previous statements as to the great frequency of carcinoma were not exaggerated. Surely one-fifth of the cases which present themselves for operative treatment to relieve prostatic obstruction are carcinomatous, though the diagnosis is often quite difficult. Induration is the most important factor and its presence, even when localized to a small part of the prostate, should make one at once suspect carcinoma. Careful rectal charts should be made on which are recorded the size, configuration and consistence of various portions of the prostate and adjacent structures, as shown in *Figs. 1 and 2*. Where the induration is almost cartilaginous and the x-ray eliminates calculus, cancer can usually be diagnosed in men past 45 years of age.

The induration is quite different from that seen as a result of chronic inflammation. It is surprisingly localized and gives the appearance of encapsulation in early cases, leading one at first to think that it can be only a particularly indurated spheroid. In many cases the diagnosis can be made positively only at operation, and it is here that the perineal incision with adequate exposure of the posterior surface of the

*Read in Section on Urology, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

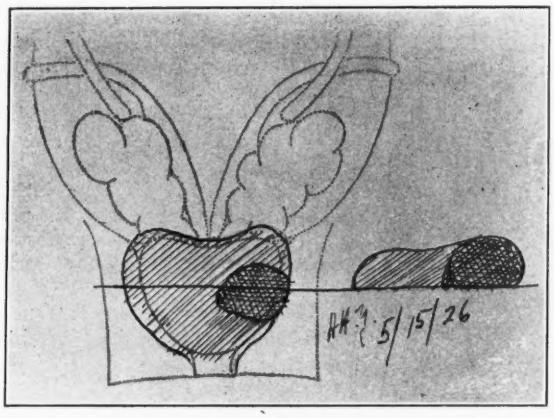

Fig. 1. Rectal chart showing slight prostatic hypertrophy of first degree induration and nodule in the right lobe of third degree induration. Diagnosis, carcinoma. Radical operation. Apparently cured.

prostate as shown in *Fig. 3* is indicated. Palpation and resection, if necessary, can be carried out, so that microscopic examination may be made of a frozen section before one proceeds with the radical operation necessary to effect a permanent cure. We have encountered cases of tuberculosis where the induration was so marked and so sharply defined that early carcinoma was suspected. The diagnosis here is extremely difficult and in some cases resection after perineal exposure is necessary. We have also seen cases of tuberculosis associated with hypertrophy. In these cases the tuberculosis has always been located in the posterior lobe behind the lateral hypertrophies and through the perineum it may be radically resected at the same time that prostatectomy is done. In one of our cases of tuberculosis of the prostate and seminal vesicles in which vesiculectomy and removal of a large part of the lateral lobes were carried out, the patient returned several years later with pronounced hypertrophy of the lateral and median peri-urethral lobes, which were removed through a suprapubic operation. The patient is now well after ten years.

In the diagnosis of these conditions a cystoscope which will give not only the right angle view, but an antegrade view and retrograde view is of the greatest assistance. Our new combined cystoscope which provides these telescopes has proved of great value, particularly in the added information which it gives by the fore-oblique view in the study of the posterior urethra and the retrograde view of the vesical orifice. Occasionally the study of the posterior urethra makes it possible to recognize carcinoma of the prostate when rectal examination is not positive.

In the preliminary study of prostatic cases the correlation between the blood urea and 'phthalein test is of the greatest importance. Of the two, the 'phthalein is the most valuable, because one may find a normal blood urea or non-protein-nitrogen test associated with marked impairment of the kidneys, as shown by a poor 'phthalein output. Our technic is to take first the 'phthalein test, and, if this is good, we are certain that the blood chemistry will be normal. If the 'phthalein test shows marked impairment the blood chemistry is essential to show how much nitrogen retention in the blood is present. Ambard's constant has not proven reliable in our hands.

For a proper study of the renal function with the 'phthalein test the ordinary collection of two separate hours does not give as much information as when the urine is more frequently collected. In a very excellent study of the question at the Brady Clinic, Shaw has shown the marked difference obtained by 15 minute determinations of 'phthalein percentages in comparison with two one-hour collections. He has worked out a normal curve which is interesting to compare with the curves obtained in various degrees of renal impairment. We have found that it is quite satisfactory to take one-half-hour readings, and I have modified the Shaw chart (*Fig. 4*) so as to include the appearance time in the first part of the curve. By this means it is possible to see at a glance the rapidity of elimination and to compare it with successive studies, as shown in *Fig. 5*. It will be seen here that in this chart the appearance time is noted and the amount of elimination in one-half-hour intervals is taken from the injection time.

These modifications of the original 'phthalein test are of considerable importance, not only in their use in urology, but generally in medicine and surgery and wherever accurate information regarding kidney function is desired.

In the determination of when to operate, one may be guided considerably by the change in the curve for the first half hour in my chart as shown in the case in which we have charted

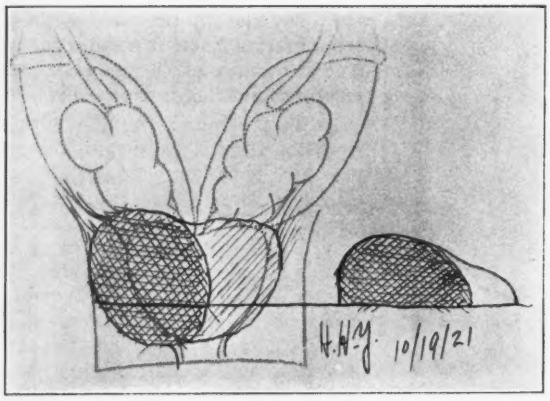

Fig. 2. Chart of rectal examination in case of slight hypertrophy of prostate of first degree induration of right lobe; large carcinomatous involvement of left lobe. Third degree induration. Radical operation. Good result.

the weekly 'phthalein and blood area tests (*Fig. 5*). If it becomes rapidly steeper and higher, reaching far above 20 or 25 per cent in the first half hour with definite improvement in the appearance time, one may say that the kidneys are not markedly impaired, especially if the total for two hours increases to 40 or 50 per cent. Where the improvement is slower, as shown by the failure of the first one-half hour curve to rise promptly or even after a week or more of catheter drainage, one may have to conclude that chronic nephritis is present, that it is impossible to get very great improvement. When it is determined that the kidneys have become stabilized under drainage one may often decide that prostatectomy under caudal anesthesia may be safely carried out. We not infrequently operate with a total 'phthalein of less than 30 per cent in two hours, when the first half hour is fairly good and the blood urea is normal. During this preliminary treatment with a retained catheter the use of large amounts of water by mouth, by rectum, subcutaneously or even intravenously, occasionally combined with glucose, is of great value. It is marvelous how severe uremias may be thus washed away and renal impairment in a few weeks become so greatly diminished that prostatectomy can be carried out quite safely.

In the preliminary study and treatment of these cases the cardio-vascular system requires close attention. In at least 50 per cent of the cases some impairment exists, either as a myocardial or endocardial lesion, or, as high blood pressure. Under rest in bed, continuous drainage and internal hydrotherapy the cardio-vascular conditions as a rule improve steadily. The use of appropriate medicines, however, is of great help, and here an internist skilled in cardiovascular and renal conditions, and with long experience in observing, in conjunction with the urologist, the medical problems associated with prostatic hypertrophy, is of the greatest assistance. Digitalis is, of course, of the greatest value and a large percentage of our cases are thoroughly digitalized before operation.

The choice of an anesthetic is considerably influenced by the cardio-renal problem. With impairment of the kidneys all general anesthetics are undesirable, and here caudal anesthesia has proved most satisfactory in our hands. We now employ a 3 per cent procain, which is injected into the sacral canal, epidurally, and as a rule 20 c. c. is sufficient, even in very large men. Shaw has shown that when larger amounts of weaker solution are used the fluid penetrates much higher than necessary, reaching even the upper dorsal and cervical region. By using a more concentrated solution far less reactions and better anesthesia are obtained. A drop in blood pressure, however, is not infrequent, but may be corrected by intramuscular injection of adrenalin, generally 4 or 5 minims of 1:1,000 solution being sufficient. If the drop in blood pressure is very sudden and pronounced, an intravenous injection of 1 minim is usually sufficient to bring about a rapid restoration of pressure.

One great advantage of the caudal anesthesia is that it gives splendid muscle relaxation, even better than a general anesthetic, and the slight lowering of blood pressure gives a drier wound with less bleeding points to clamp. In about 94 per cent of the cases very satisfactory anesthesia is obtained. For details one is referred to a recent exhaustive study by Berry at this clinic.* Caudal anesthesia is also particularly valuable when pulmonary lesions are present, either tuberculosis or chronic inflammation. If the caudal is unsuccessful we usually prefer nitrous oxide oxygen or ethylene anesthesia. For the

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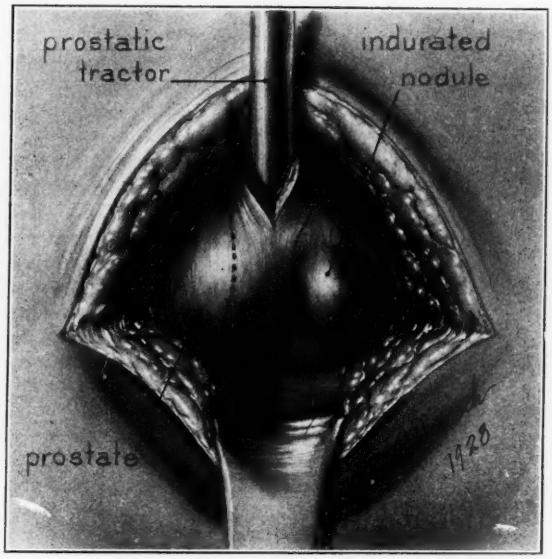

Fig. 3. Prostate exposed through perineum and drawn downward by tractor introduced through the membranous urethra into the bladder. Indurated nodule in right lobe suspicious of cancer. Excised (dotted line) for frozen section and microscopic study. Proved to be malignant; radical operation carried out. If it had been shown benign prostatectomy would have been done through bilateral capsular incisions.

cardiac cases, when a general anesthetic is required, ether is the best. The blood pressure is generally increased even by ether, although less than with nitrous oxide.

Choice of Route.—I have long been an advocate of the perineal route and experience has made me more convinced that in the great majority of cases it is far preferable to the suprapublic. I have mentioned, above, the fact that carcinoma is present, associated with hypertrophy in at least one-fifth of the cases of prostatic obstruction in old men. The fact that over 70 per cent of our cases in which the radical operation has been performed for cancer of the prostate are still alive over five years after leaving the hospital is a strong argument for the value of the perineal route. In cases of simple benign hypertrophy the fact that it is unnecessary to go through the bladder twice to expose the prostate, but also that it can be enucleated conservatively with preservation of the verumontanum, ejaculatory ducts and little injury of the internal sphincter, that hemorrhage can be easily controlled, that dependent drainage is secured, that wound infections are less serious and abdominal distensions and other gastro-intestinal complications less frequent, are all strong arguments for the perineal route.

It is admitted that the technic is a little more difficult, but surely the surgeon who is pretending to take care of all types of prostatic surgery must become adept in perineal operations. The bugaboos of incontinence and rectal injury come from a failure to do an anatomical operation which is not difficult to learn or carry out satisfactorily. After introducing my prostatic tractor and bringing the posterior surface of the prostate down into view, one is prepared not only to complete one's diagnosis as to the presence or absence of carcinoma or tuberculosis, but to carry out any form of incision for enucleation or resection that may be desirable.

For many years I employed a bilateral incision through which the lateral and median lobes were enucleated with preservation of the floor of the urethra, ejaculatory ducts and with little more than dilatation of the internal sphincter. The same operation is used in all youngish men with normal sexual powers and in cases of carcinoma where it is desirable to remove simply the lateral and median obstructions, the bilateral technic should always be used. No difficulty is experienced in resecting the lateral and median portions and thus completely removing obstruction with very little injury to the urethral mucosa. It is amazing what excellent functional results are obtained, results which not infrequently continue as long as the patient lives and in some cases five or six years.

Through an inverted "V" capsular incision it is possible to turn back the floor of the urethra, expose the verumontanum, prostate, ejaculatory ducts, and after division of the mucous membrane in front of the median lobe, to remove the entire adenomatous hypertrophy in one piece in most cases, sometimes along with the anterior commissure. A more satisfactory specimen is thus obtained than by any other technic, either perineal or suprapubic, and it is secured with a minimum of injury to the internal sphincter. This is the method which we now use in very great hypertrophies and in very old men.

In the latter type of case the Davis drainage bag, which is inserted into the bladder, blown up and traction made, is most satisfactory, in that it provides not only complete hemostasis, but excellent drainage. Where the patient is in good condition, and it is not necessary to hurry, I prefer now to carry out a plastic closure of the prostatic wound, the sutures being placed through the vesical orifice and tied on each side and posterior so as to arrest the hemorrhage and at the same time obliterate the prostatic cavities and approximate the edges of the capsular wound, as in *Fig. 6*. One of these sutures is usually brought out through the posterior flap and tied around the ejaculatory ducts with the idea of minimizing the incidence of epididymitis.

A urethral catheter takes care of drainage and is allowed to remain in place for about eight or nine days. After its removal normal urination occurs immediately in a large percentage of the cases. In 60 per cent we have obtained *per primam* healing by this prostatic plastic without any leakage of urine through the perineum. By this means the stay of the patient in the hospital has been reduced about 50 per cent, and even though there is perineal leakage in about 40 per cent of the cases, considerable progress has been obtained by means of this new plastic closure of the prostatic wound.

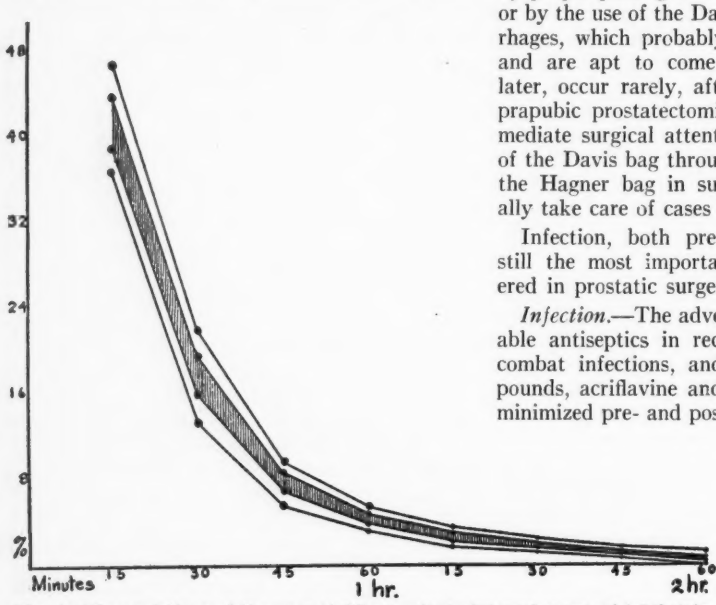

Fig. 4. The variations of the normal fifteen-minute interval curve of 'phthalein elimination as determined by forty-four tests on twenty-three normal individuals (Shaw).

Post-Operative Complications.—Epididymitis is one of the most common and annoying complications following any type of prostatic operation. It often comes on before operation as a result of infection, not infrequently following catheterization, cystoscopy or urethral drainage. In order to prevent this, Alyea, of my clinic, has been carrying out systematic ligation of the vasa deferentia by means of a suture placed through the skin according to the technic devised by Colston. The vas deferens having been isolated and held up so that it lies immediately beneath the skin, the silk worm gut suture is passed around it through the skin and tied externally. In something over sixty cases in which Alyea has carried out this procedure there have been only two cases of epididymitis and in both of these urethral instrumentation had been done before the sutures were placed. The sutures are removed in about two weeks, and it is probable that the continuity of the vas is re-established subsequently, but this, we believe, is advantageous.

Hemorrhage.—Hemorrhage, which is another serious post-operative complication, is prevented by proper placing of the sutures above described or by the use of the Davis bag. Secondary hemorrhages, which probably proceed from infection, and are apt to come on two or three weeks later, occur rarely, after both perineal and suprapubic prostatectomies, and may require immediate surgical attention. The re-introduction of the Davis bag through the perineal wound, or the Hagner bag in suprapubic cases, will usually take care of cases of most acute bleeding.

Infection, both pre- and post-operative, is still the most important complication encountered in prostatic surgery.

Infection.—The advent of many new and valuable antiseptics in recent years has helped to combat infections, and the use of silver compounds, acriflavine and other drugs has greatly minimized pre- and post-operative infections. In a long series of experiments with many chemical compounds mostly of dyestuffs, we have been convinced that No. 220 of our series, mercurochrome, is the most valuable, both in combating infec-

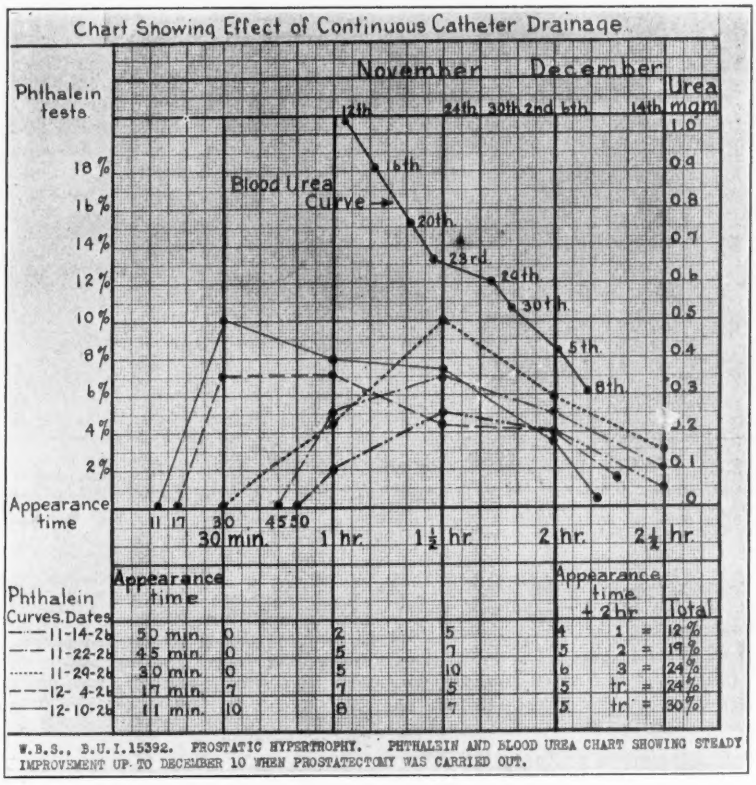
Chart Showing Effect of Continuous Catheter Drainage.
November
December
Phthalein tests
Urea mgm
Blood Urea Curve
12th
6th
20th
23rd
24th
30th
5th
8th
14th
Appearance time
30 min.
1 hr.
2 hr.
Phthalein Curves. Dates
Appearance time
Appearance time + 2 hr.
Total
11-14-26 50 min. 0 2 5 4 1 = 12%
11-22-26 45 min. 0 5 7 5 2 = 19%
11-29-26 30 min. 0 5 10 6 3 = 24%
12- 4-26 17 min. 7 7 5 5 tr = 24%
12-10-26 11 min. 10 8 7 5 tr = 30%
W.B.S., B.U.I.15392. PROSTATIC HYPERTROPHY. PHTHALEIN AND BLOOD UREA CHART SHOWING STEADY IMPROVEMENT UP TO DECEMBER 10 WHEN PROSTATECTOMY WAS CARRIED OUT.

Fig. 5

tions of the urethra and bladder before operation, in the cleaning up of the skin at operation, in local treatment after operation, and through intravenous therapy when local or generalized infections occur. Except in fulminating cases of septicemia we now employ smaller doses, generally beginning with 2 mg. per kg. (about 10 c. c. of a 1 per cent solution per 100 pounds of body weight) and increase the dose 4 or 5 c. c. at intervals of two or three days. In hundreds of cases we have demonstrated that it may be used with impunity even when the kidneys are impaired, as in pyelonephritis and even in acute nephritis and with bacteria present in large number in the urine from the kidneys. When, during the pre-operative or post-operative period of prostatic cases a septic condition develops we almost always use intravenous injections of mercurochrome, often before it is possible to determine whether the fever is due to urethritis, cystitis, peri-urethral, peri-prostatic, or perineal wound infection, or whether pyelonephritis, bronchitis or bronchopneumonia are present. As a result of very extensive experience, we are convinced that by this means the infections and inflammatory complications attendant upon the treatment of prostatic cases can be more effectively handled and with a much reduced mortality.

CONCLUSIONS

In the brief time allotted it is possible to take up only a few of the interesting problems. It has been shown that the diagnosis of carcinoma is extremely important, and for this reason the perineal exposure is essential. Through the perineum a radical curative operation in cases of early carcinoma can be effected in about 70 per cent of the cases. The occasional presence of tuberculosis and the good results obtained by radical perineal attack is another argument for

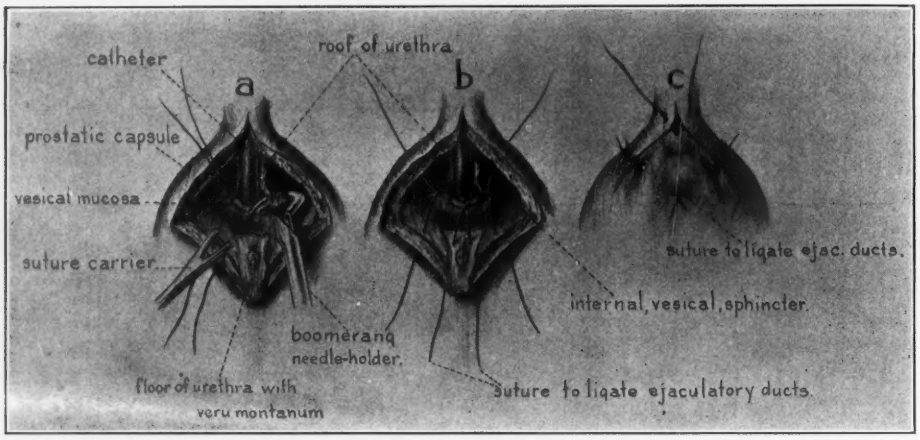

Fig. 6. New technic for the plastic closure of the prostatic wound after prostatectomy through the inverted "V" capsular incision. Three stitches are placed with the Boomerang needle holder through the vesical mucosa and muscle on each side of the prostatic orifice and posteriorly. They are tied to arrest hemorrhage and then brought out through the capsule on each side and posteriorly, as shown in b, and tied so as to approximate the wound and close the urethrotomy. Posterior sutures are tied around the ejaculatory ducts to prevent epididymitis.

the perineal route, but more important is the fact that the perineal operation can be satisfactorily done by means of simple caudal anesthesia with more certain control of hemorrhage. The use of plastic closure gives *per primam* healing in 60 per cent of the cases, and greatly reduces the post-operative stay in the hospital. By means of recent improvements in the study of the renal function by the 'phthalein test, and the employment of appropriate measures to combat the cardio-vascular conditions, almost all cases can eventually be prepared for safe and satisfactory operation for the removal of prostatic obstructions through the perineum.

DISCUSSION (*Abstract*)

Dr. Russell A. Hennessey, Memphis, Tenn.—It is very encouraging to me to hear Dr. Young state that he uses catheter drainage as a preparatory measure almost exclusively. In our experience the inlying catheter has proven a most satisfactory method of drainage. The facility with which bladder decompression and drainage can be accomplished, and early cystostomy, with its immediate undesirable consequences, avoided, recommends it to us. Since almost every prostatic presents a definite medical problem, we find the close cooperation of the internist to be very heartening. We follow the practice of cystoscoping all cases after the early preparatory period to determine the character of the obstruction and so decide the method of removal. Our experience in the intravenous use of mercurochrome had been limited, but we use it copiously in the infected bladder and along the line of incision post-operatively.

Dr. Bransford Lewis, St. Louis, Mo.—You all remember the time when the genito-urinary surgeon was asked to come out to a town in the country and operate upon a prostatic patient. He would gather up his instruments and go out and operate, with what result? The 50 per cent mortality that readily followed that sort of work. No such procedure is justifiable in urologic work of any kind today. The way must be prepared by proper treatment for one operation or the other.

I think there is no discussion, and I would not raise any, as to the preference between perineal and suprapubic prostatectomy. I did the perineal for several years before adopting the suprapubic and my own choice was not based on whether one was easier to do than the other, but in my opinion the suprapubic gives the better result, which is the argument with me.

What are the details that have secured the success that has reduced the mortality from 30 to 40 per cent down to 2 or 3 per cent? Just the things Dr. Young brought out, the best things in the world when it comes to prostatic surgery. The decompression, to my mind, is so necessary that I think no successful prostatectomy can be carried out without this measure. I have seen several patients die before we could get the prostate out, because the decompression was made complete at once. The physician received the blessing of the old ladies who stood around when he finally got the catheter in and released the forty ounces of urine, but this was followed by the death of the patient. I heard it stated in the discussion of this point about three years ago in Chicago that this was all nonsense, that it was not necessary to be particularly careful about this preliminary preparation; but those who have had experience know that it is one of the essentials to reduce the intra-ureteral pressure very gradually. If we find thirty ounces, we draw that out and immediately put in fifteen ounces of sterile boric solution, leave the catheter in and later withdraw some more, and then replace ten ounces, gradually reducing the urine from retention to a condition in which you

can make a constant drainage through the urethral catheter. By this means we soon have the patient sitting up and happy, and in the meantime we have gone through all the necessary tests.

Dr. Young mentioned the reduction in the blood pressure. There has been brought out a drug called ephedrin which sustains the blood pressure in these cases. It is much more effective than others for this purpose.

I have found that a very efficient method of preventing infection between the prostatic wall and the abdominal wall is to put in fixation sutures. When we make our suprapubic incision we have exposed the anterior wall of the bladder and we put a catgut suture down through the fascia and muscle and into the bladder wall on one side and then come out of the bladder wall through the muscle and its overlying fascia. That suture and a similar one on the other side, with possibly a third running across the bladder wall and out through the fascia and muscle give good service. We do not tie these sutures at once, but after we have everything out we tie them and this fastens the bladder wall up against the abdominal wall. Since I have used this method I have not seen the infection that I saw before. In placing these sutures draw the bladder toward the midline forcibly with dissecting forceps and then you have plenty of room for the bladder wall to unite in the subsequent convalescence. This is a very serviceable procedure.

Dr. A. I. Folsom, Dallas, Tex.—Dr. Young brought out one of the most essential things in prostatic surgery today, the close association of the urologist and the internist in estimating the physical status of the patient. We have during the last few years, by reason of these various laboratory and technical procedures, succeeded in reducing the mortality of prostatic surgery, but we have lost sight of a very fundamental thing. That is, that regardless of this there is a physical sum total that makes an entity that is very well worth estimating. This is best obtained by the close association of the internist and urologist, not by a heterogenous group, seeing one internist today and another tomorrow, but by having the internist closely associated from day to day with these cases to learn what can best be done in hazardous risks. We make it a point to meet and concur daily in this way in interpreting new points on the heart, the kidneys and so on, and we both profit by the association. There are many things to think about: the color of the patient's face, the appearance of his eyes, his outlook on life, and everything about him go to make up the clinical judgment of the case as a whole.

The question of infection following the operation is very important. We have in the last several years been using somewhat the technic Dr. Lewis suggested, except that we differ in this respect: one of the fundamental dangers in the suprapubic operation, which I use, is the dislocation of the anterior bladder wall from the posterior aspect of the symphysis pubis and stripping it down we lay wide open the space of Retzius. I prevent that in this way (illustrating), and before I open the bladder I take this last extremity, go through the muscle and so on, and I tie it then. What have I done? I have securely closed the space of Retzius and have anchored the bladder wall to the abdominal wall so that when I enucleate the prostate I do not tear this open.

I am glad Dr. Young takes the position that the two-stage operation is not a necessary thing. The two-stage operation did us good and harm; for it has become a widespread opinion that all one has to do to protect the patient is to divide the operation into two stages. In many instances cases have become complicated and lives have been lost by operating upon the cases a second time through an old scar. Everyone knows that opening the peritoneum is not dangerous if we know when we open it and do a clean operation, but in going back through these scars following the first-stage operation very often the peritoneum is opened without our knowledge and many lives are thus lost.

The man who is not able to drain 95 per cent of his cases through a urethral catheter has something to learn about drainage. We are not taking pains enough in protecting the urethra. The daily injection of mercurochrome solution into the bladder before we are ready for prostatectomy is a safeguard against epididymitis and infection. Since we have used this plan we have had much less trouble. Following operation we make a daily instillation into the bladder, which cleans up and keeps sweet a situation which otherwise may give trouble.

Dr. Owsley Grant, Louisville, Ky.—In watching the progress of a prostatic case there are three things to look for: uremia, infection and hemorrhage. The uremia occurs because the patient is not properly prepared. It is due to Dr. Young's efforts that this has ceased to be a danger in prostatic surgery, so it is not considered the cause of death and morbidity. The greatest bugbear left is infection. That comes after the operation and by proper care it can be greatly helped. We were taught in the early days that the tube should be put into the bladder and left there, but I believe the tendency has changed so that now something should be done to cleanse the bladder promptly after the prostate has been removed. Dr. Folsom mentioned the instillation of mercurochrome. I think one important thing is suction. This can be applied to the bladder by a simple means in any room in which running water is available by the old suction pipe running through the water tank so that suction can be obtained of any speed desired. Since this has been in use we have found much less dissemination of infection, particularly that which occurs in pyelitis from leaving a large amount of infected material in the base of the bladder. This does not slough out entirely.

The prostatic bed becomes infected and simply irrigating the urethra through a syringe without a catheter helps to clear it out. This and the intravenous method Dr. Young mentioned have come the nearest to doing away with this bugbear, since Dr. Young eradicated that of uremia.

The other bugbear that used to be greater than it is now, I think, is controlled largely by the suture method. It has been our practice, although it seems like giving something out of a bottle to stop hemorrhage, to use some preliminary coagulant of the blood. We have found the most satisfactory thing to be ceanothyn, and usually give two doses the night before operation and three the morning of the operation, one hour apart.

Dr. D. K. Rose, St. Louis, Mo.—Regarding bladder pressure and its influence upon kidney function: I have had two interesting types under consideration for some time, brought out in the clinical use of the cystometer. In the first, we have a prostatic obstruction of duration and type only sufficient to produce a small, residual urine, which means that the secondary hyperplastic bladder wall has begun to decompensate and

can no longer completely empty the bladder over the obstruction. However, even at this time, the bladder wall is in a stage of unusual strength and, consequently, if an infection supervenes at this time, we have marked frequency, and possibly terminal pain and bleeding. It is this type that bears the urethral catheter poorly and in which a suprapubic cystostomy is often necessary and always successful. If this same individual continues through the usual stages of bladder wall decompensation the emptying pressure eventually may become even 40 or 50 millimeters of mercury below that which it was at the time the infection supervened. We have the type of individual who will bear a catheter, usually with ease, due, of course, to the low tonicity of the bladder wall, but in whom a suprapubic cystostomy, unless he is previously prepared for it in a routine manner, would be dangerous. In the first type we should probably find a normal or only slightly raised blood nitrogen, and in the second type a high blood nitrogen. It would seem, therefore, that there is a discrepancy between bladder pressure and kidney function, that high bladder pressure must persist for a long time and that changed kidney function is more likely to be associated with bladder wall decompensation than with a high intracystic pressure. The explanation, on this basis, for the changed kidney function is the changed position of the bladder base influencing kidney drainage or a long-continued reflex sympathetic stimulation from the over-distended bladder wall.

I hope that prostatic obstruction will soon not only be considered in the light of the obstruction alone, but in the light of obstruction plus its influence upon the bladder wall.

Dr. M. Casper, Louisville, Ky.—My results from the intravenous use of mercurochrome in all types of infection have been 100 per cent failure. I wish to know the difference in the number of those who have used it successfully and those who have had failures. I wish all those who have had success with mercurochrome would hold up their hands (the audience complied with this request); now those who have had failures (many less). It seems that we are in great minority with failures. I do not know why this is. I have inquired in the leading hospitals of Louisville and there have been practically 100 per cent failures with mercurochrome intravenously. In one case following cesarean section in which we used mercurochrome intravenously the woman developed an immense suppuration of the entire abdominal wall.

Dr. Young (closing).—Dr. Casper is not alone, of course, in having failures with mercurochrome. We, ourselves, have had many cases in which we failed to cure septicemia, to sterilize the urinary tract, or markedly to affect the local infection. On the other hand, we have had now a great series of cases in which excellent results were obtained by intravenous mercurochrome therapy.

There are many failures with mercurochrome which cannot be explained, but, on the other hand, there are certainly many remarkable successes, not infrequently in cases that are thought to be hopeless, and this opinion is backed by over one hundred clinical papers which have appeared in the literature in America and abroad.

SENIOR ELECTIVES AT THE UNIVERSITY OF TENNESSEE*

By O. W. HYMAN, PH.D.,
Memphis, Tenn.

During the current school year the University of Tennessee College of Medicine is offering senior elective courses for the first time. The obvious purpose of the courses is to offer to students who, for nearly four years, have followed a curriculum prescribed for them with absolute rigidity an opportunity to select for themselves one month of training in subjects to which they are led by their own interest. We purposely fix the rate of progress in the elective courses at a slower rate than that of the regular curriculum so that a more scholarly attitude may be attained and the student be encouraged to pursue both diagnosis and therapeusis thoughtfully. It is appropriate that such a course should be given after the student has been through a rigid drill in the fundamentals of medicine and just before he enters upon his internship, during which period supervision of his progress will be much less continuous than before.

In order to give the elective courses it has been necessary to rearrange the schedule of the senior year so that the students may have sufficient release from required work, and a considerable number of elective courses might be offered without seriously interfering with the routine of the hospital. These ends have been reached by first removing from the senior schedule all instruction in the minor subjects and then arranging the curriculum into eight periods of four weeks each. Two periods are assigned to medicine (including neurology and psychiatry), two to surgery, one each to pediatrics, obstetrics and gynecology, and one to elective work. The senior class in turn is divided into eight sections. Each section then takes each of the eight periods, but in a different sequence, that is, the sections take each period of instruction in rotation. In this way, each hospital service has its quota of clinical clerks throughout the year.

This arrangement of work is the familiar block system as seen from the point of view of any student section. We have felt that this is not

*Read in Section on Medical Education, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

satisfactory in some respects. For instance, we think that a section having completed two periods in medicine should not feel that it has been graduated as far as medicine is concerned and dismiss the subject from mind. To avoid this possibility, we have a weekly conference with the entire class on each of the subjects: medicine, surgery, pediatrics, obstetrics and gynecology, and a final examination in each subject is given at the end of the year.

The plan of the senior schedule may be most easily understood from the following table:

We have so far organized elective courses in the following subjects: tuberculosis, diseases primarily affecting the blood, chest diseases, heart diseases, gastro-enterology, dermatology and neurology with special reference to syphilis, pediatrics, ophthalmology, oto-laryngology, urology, orthopedic surgery, roentgenology, obstetrics and gynecology. It will be noticed that most of these are in the specialties of medicine and surgery. In the required curriculum we have cut down the time allotted to these subjects to a minimum and, consequently, the elective courses are here especially helpful as offering opportunities for students who wish to extend their information in these fields.

The elective courses are given in appropriate pairs as, for example, ophthalmology and oto-laryngology. The students are assigned to the one course during the morning hours and to the other during the afternoon. Pediatrics and gastro-enterology, however, are not paired, but occupy both morning and afternoon periods during their months.

The organization of each course varies in accordance with the subject matter and the ideals of the instructor. In a general way, each provides for a brief review of the anatomy, physiology or chemistry on which the course is based and a detailed study of patients in the hospital beds or the out-patient department, explaining and exemplifying the methods of diagnosis and treatment. The information gained in case studies is broadened by study in the library. The time assigned for library work is generally under an instructor. The purpose here is to teach the student effective methods of keeping in touch with current literature and the means of developing a bibliography on special topics. The instructor conducts a seminar on the library work. This part of the course has proven to be stimulating to both students and staff.

The following outlines of the courses on pediatrics and gynecology are illustrative:

Certain prerequisites may be imposed upon candidates for the elective courses. The student may be required to accomplish the review of the anatomy, physiology or pathology by taking elective work in these subjects during his junior year. He may be required to attain during the junior year a certain minimum grade on the subject that he elects for his advanced senior work.

In calling our courses "elective" we must be understood as using the word in a Pickwickian sense. Students elect their courses, giving first, second and third choices. However, not more than an eighth of the class is assigned to any course and, if less than an eighth choose any course, enough additional are assigned to fill its quota. Consequently, it sometimes happens that a student is assigned to courses that he did not choose. Naturally, some of the courses are more popular than others. In our experience this year twenty-two of a class of sixty-three was the highest number electing the same course, while another course had only a single applicant. In filling the sections we select first those who have fulfilled the instructors' requirements for admission. If there are still more than can

TABLE 1—FOURTH-YEAR SCHEDULE
1927-1928

Sec.	October	November	December	January	February	March	April	May
1	Medicine	Medicine	Pediatrics	Gynecology	Obstetrics	Elective	Surgery	Surgery
2	Medicine	Medicine	Gynecology	Pediatrics	Elective	Obstetrics	Surgery	Surgery
3	Surgery	Surgery	Medicine	Medicine	Pediatrics	Gynecology	Obstetrics	Elective
4	Surgery	Surgery	Medicine	Medicine	Gynecology	Pediatrics	Elective	Obstetrics
5	Obstet.	Elective	Surgery	Surgery	Medicine	Medicine	Pediatrics	Gynecology
6	Elective	Obstetrics	Surgery	Surgery	Medicine	Medicine	Gynecology	Pediatrics
7	Pediatrics	Gynecology	Obstetrics	Elective	Surgery	Surgery	Medicine	Medicine
8	Gynecol.	Pediatrics	Elective	Obstetrics	Surgery	Surgery	Medicine	Medicine

TABLE 2—GYNECOLOGY

Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8- 9	Clinic General Hospital	Clinic Baptist Hospital	Library	Library	Lecture Preparation of Patient Post-Operative Treatment Complications	Clinical Conference
9-10	Clinic General Hospital	Clinic Baptist Hospital	Library	Library	Gynecological Histology and Pathology	Gynecological Histology and Pathology
10-11	Ward Rounds	Ward Rounds	Ward Rounds	Ward Rounds	Ward Rounds	Ward Rounds
11-12	Visiting Patients in Hospital Daily Notes History Writing	Visiting Patients in Hospital Daily Notes History Writing	Visiting Patients in Hospital Daily Notes History Writing	Visiting Patients in Hospital Daily Notes History Writing	Visiting Patients in Hospital Daily Notes History Writing	Visiting Patients in Hospital Daily Notes History Writing

be assigned, we select those with the highest scholastic record during the junior year. Those not selected are assigned to another section, as far as possible, in accordance with their second or third choices. This method places a considerable premium on a good scholastic record during the junior year.

While our senior electives promise to be valuable to students and staff alike, we have established them with a certain degree of apprehension. We feel that the present-day tendency of students to pass from the college of medicine through a special internship and, perhaps, several years of special hospital training into the practice of one of the specialties may lead to greatly improved operative technic, but also to biased or sadly incompetent judgment. If we find that our courses definitely encourage students to too early specialization, we shall discontinue them. As a matter of fact, the courses are virtually post-graduate in character and, at the present time, we admit graduates to them. We may easily restrict them to graduates with several years of practice if this seems advisable.

DISCUSSION (*Abstract*)

Dr. Alan M. Chesney, Baltimore, Md.—The matter of elective courses has come very much to the forefront at the Johns Hopkins Medical School this year because of an increase in the amount of free time available for the student. In the past this free time was scattered throughout the first three years in occasional hours and was not concentrated except in the last year. When the curriculum was revised a serious attempt was made to concentrate this free time so that in the fourth-year class the student has one-half of his entire

TABLE 3—PEDIATRICS

Hours	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
8- 9	Infant Feeding Nutritional Disturbances Dr. Mitchell	Surgical Clinic	Eye Dr. Stanford	Care of New Born Dr. Quinn	Infant Feeding Nutritional Disturbances Dr. Mitchell	Genito-Urinary Dr. Livermore
9-10	Chemistry of Nutrition	Diseases of the Lungs Dr. Rucks	Chemistry of Nutrition	Neurology Dr. Semmes	Chemistry of Nutrition	Nutritional Disturbances Dr. Jacobs
10-12	Medical Ward Walks	Malaria Dr. Krauss	Diseases of the Heart Dr. Stern	Contagion Dr. Levy	X-Ray Diagnosis	Round Table Discussion
		Nutritional Disturbances Dr. Jacobs	Tuberculosis Dr. Price	Nutritional Disturbances Dr. Jacobs	Parenteral Infection Dr. Hobson	
1- 2	Diagnostic Methods Sensitization Dr. Blue	Dermatology Clinic	Medical Clinic Dr. Mitchell	Blood Transfusions Dr. Mims	Diagnostic Methods Dr. Blue	Visit to Cheerfield Farm
2- 4	Hygiene Dr. Graves	Eye, Ear, Nose and Throat Clinic	Orthopedic Clinic	Clinic Out-Patient Department	Syphilis Clinic	
4 to 5	Physical Examination History Writing Drs. Blue and Jacobson	Library	Neurology Dr. Semmes	Library	Library	

year free to use as he pleases. However, he must, in order to obtain his degree of Doctor of Medicine, satisfy the Faculty that he has used his free time well. In other words, he has to give an account of his time which he did not have to do in the past to any appreciable extent.

Provision for abundant free time implies two responsibilities which the Faculty now insist upon. One is an adequate check on that free time; secondly, the responsibility to see to it that the student uses his free time well. In order to take care of the latter responsibility the department heads have signified their willingness to interview students and advise them as to how they should spend that time in accordance with any particular interest which they may have. The utmost freedom is granted. Students may migrate to other institutions, not only to medical schools, but to hospitals under proper supervision, and receive credit for the time they put in at those other institutions. They may take courses in the School of Hygiene. Any of the required courses in medicine or surgery may be taken as elective, so that if a particular student develops an interest in internal medicine and feels that he has not received all the instruction that he wishes in that branch he may repeat his fourth-year work if acceptable to the Professor of Medicine. No distinction is drawn between the third- and fourth-year classes as regards elective courses. All the subjects are open, with a few limitations imposed by individual instructors.

I have taken the opportunity to analyze the choices of the men in the present fourth-year class who have had an opportunity to signify what they wanted to do this year. Actually thirty-two members of the present fourth-year class were in the elective group, and while that is a small number as far as statistics go, still straws sometimes show which way the wind is blowing.

We have been asked what the men are doing with this free time. One-fourth of those thirty-two men have devoted their entire time to one particular subject, as for example obstetrics. Another group has devoted its time to two closely related subjects. Another quarter has migrated and a last quarter has spent its time indiscriminately over many different courses. Now the migrating students have interested us very much. Two have gone abroad. Two went to Canada and are serving in hospitals there. Two have gone to other schools or hospitals in the United States and two are substituting in our own hospital. There is not much tendency manifested in this particular group to devote the entire time to pre-clinical work. One student, a woman, is doing research in anatomy the entire time; two others are doing research in physiology and are assisting as demonstrators. The remainder have put their time in clinical work.

There is already manifest apparently a tendency on the part of the men to elect didactic courses. Apparently those courses hold the interest of the student. Those who are in favor of the old didactic lecture method may point to this tendency as an indication of the student's interest in that sort of instruction. There is some evidence to indicate that those instructors who make the most of the loop-holes in the curriculum and arrange their courses for the hours that the students are most apt to be free will get the greatest number of students in the elective courses.

Dr. Hyman (closing).—We approach this elective work with caution. Our Faculty still believes that better results are likely to be obtained when the student is directed by the Faculty than when he follows his own inclinations. We view our elective courses as an experiment and I doubt that we shall make very rapid progress toward the development of a course such as is now possible at the Johns Hopkins.

RELATIVE PROPORTION OF DISEASES AND CONDITIONS TREATED BY OUR GRADUATES IN THEIR PRACTICE*

By C. C. Bass, M.D.,
New Orleans, La.

We have undertaken to ascertain the relative proportion of different diseases and conditions treated by our graduates in their practice. A part of the data is presented in this paper.

All Tulane graduates who graduated from 1909 to 1922, regardless of where they were practicing or the nature of their practices, were asked to take part in the study. Suitable blanks with return stamped envelopes were sent about every two to three weeks, with request that a complete list be made and returned, of all cases of whatever nature seen during the day. Office, house and hospital visits were reported without distinction, and whenever the diagnosis was doubtful, the most probable diagnosis was reported. The study was continued from April, 1926, to April, 1927. Continuing it over a period of a year reduces to a minimum the influence of seasonal variation in the prevalence of certain diseases.

A total of 480 physicians, 303 general practitioners and 177 who stated that they practiced one specialty or another, took part and made reports. Some sent in only a few reports during the period, while many reported regularly throughout. Most of the Tulane graduates are

TABLE I
STUDY—TULANE MEDICAL GRADUATES

	No. Physicians Reporting	Days of Practice	No. of Visits
General practitioners	303	3,112	40,207
Specialists:			
Surgery	52	459	7,315
Eye, ear, nose, throat	34	316	4,871
Urology	20	260	8,725
Medicine	17	218	3,497
Pediatrics	17	134	2,178
Obstetrics	15	162	2,426
Roentgenology	7	75	929
Neurology, psychiatry	6	101	1,095
Dermatology	5	43	1,340
Tuberculosis	4	50	1,712
Totals	480	4,930	74,295

*Read in Section on Medical Education, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

in the near-by Southern states. Therefore, the information is more definitely indicative of the practice experience of physicians in the South.

The cooperation of those physicians who took part and made this study possible is deeply appreciated. I am under great obligation to Dr. W. C. Rappleye, Director of Studies of the Commission for the Study of Medical Education, for making a thorough analysis and tabulation of the enormous amount of material.

The distribution of the physicians in the group according to the kind of practice done, the days of practice reported and the number of visits reported is shown in *Table I.* It will be noted that the number of days of practice reported per physician averages about ten and that the average number of visits per day is about thirteen for the general practitioner and over nineteen for the specialists.

TABLE II
ANALYSIS OF VISITS—GENERAL PRACTICE

			%
Minor surgery		6255	15.6
Influenza, bronchitis		3047	7.6
Venereal diseases		2443	6.1
Gonorrhea	2218		
Chancroid	115		
Syphilis (primary)	110		
Gastro-intestinal disorders		2221	5.6
Colitis	396		
Constipation	395		
Diarrhea	386		
Cholecystitis	385		
Indigestion	377		
Gastric ulcer	122		
Food poisoning	111		
Duodenal ulcer	49		
Throat infections		1622	4.4
*Contagious diseases		1616	4.4
Gynecological conditions		1548	3.9
Pelvic inflamatory disease	547		
Operation, abdominal	66		
Operation, perineal	28		
Miscellaneous	907		
Cardio-vascular-renal diseases		1434	3.7
Obstetrics, visits		1433	3.7
Normal	1171		
With complications	243		
Extra-uterine pregnancy	19		
Syphilis		1249	3.3
Late, adult	1204		
Congenital	45		
Vaccinations, inoculations		1161	2.9
Malaria		1080	2.7
Skin diseases		1053	2.7
Infant feeding		917	2.4
Pneumonia		739	2.0
Tuberculosis		726	2.0
Pulmonary	598		
Non-pulmonary	128		
Physical examination		721	1.9
Appendicitis		660	1.8
Operation	186		
Undefined	164		
Acute	161		
Chronic	113		
Sub-acute	36		
Obstetrics, deliveries		564	1.6
Normal	508		
With complications	50		
Cesarean section	6		
Emergencies, major accidents		516	1.4
Pyelitis		476	1.2
*Malignant disease		453	1.0
Post-operative dressings		435	1.1
Typhoid fever		403	1.0
Absorption, miscarriage		376	0.9
*Eye disorders		371	0.9
Psychoneurosis		361	0.9
Ear disorders		349	0.8
Otitis media	330		
Others, miscellaneous	19		
Arthritis		348	0.8
Cystitis		347	0.8
Prostatitis		286	0.7
Diabetes		276	0.6
Neuritis, sciatica		239	0.6
Asthma		231	0.5
Pellagra		192	0.4
Hernia		179	0.4
Thyroid disorders (2/3 toxic)		171	0.4
Anemia		161	0.4
Intestinal parasites (½ hookworm)		148	0.3
"Rheumatism"		142	0.3
Hemorrhoids		133	0.3
Nose disorders (chiefly sinusitis)		132	0.3
Varicose veins and ulcers		130	0.3
Lumbago		121	0.3
Elective operations		121	0.3
Calculus, urinary tract (chiefly kidney)		113	0.2
Anesthesia		104	0.2
Tonsillectomy		101	0.2
Osteomyelitis		95	.03
Adenitis, cervical		84	.02
Adenitis, inguinal		82	.02
Erysipelas		76	.02
Rheumatic fever		73	.02
Stricture, urethra		71	.02
Stomatitis		70	.02
Amoebic dysentery		66	.02
Arthritis, gonorrheal		47	.02
Extra-uterine pregnancy		19	.01
Miscellaneous general diseases		1287	3.2
Miscellaneous urological conditions		160	.4
Miscellaneous diseases of childhood		173	.4
			100.0

*See list.

The work of the general practitioner is shown in *Table II.* Over 15 per cent of the visits were for minor surgical conditions, while only a very small per cent could be classed as major surgical conditions. Influenza and bronchitis come next in frequency, 7.6 per cent. If we add to this the throat infections, pneumonia and tuberculosis, we have about 16 per cent for the respiratory diseases. Venereal diseases come next in frequency, 6.1 per cent, over 90 per cent of which is gonorrhea. If we add to venereal diseases late and congenital syphilis, we find that nearly 10 per cent of the visits of general practitioners are for this class of diseases. Of particular interest is the comparative infrequency of many diseases and conditions shown in the lower half of the table, to some of which we devote a large part of the time in our courses.

Table III shows the distribution of visits of those who specialize in surgery. Gynecological conditions and minor surgery each constitute over 16 per cent, the two together amounting to one-third of the visits in the practice of surgeons. This again emphasizes the importance of minor surgery in the medical course. The ma-

jor surgical disease that occurs most frequently is appendicitis.

TABLE III

ANALYSIS OF VISITS—PRACTICE OF SURGERY

			%
Gynecological conditions		1219	16.8
Miscellaneous	880		
Pelvic inflammatory disease	178		
Operations (2/3 abdominal)	116		
Abortion, miscarriage	45		
Minor surgery		1205	16.7
Post-operative dressings		560	7.7
Appendicitis			
Gynecological conditions			
Extremities, major accidents, orthopedics			
Hernia			
Laparotomies other than above			
Thyroid, breast, chest, etc.			
Appendicitis		355	5.0
Operation	150		
Acute	68		
Chronic	61		
Undefined	53		
Sub-acute	23		
General medical diseases		355	5.0
Gastro-intestinal disorders		326	4.5
Emergency, major accidents		299	4.1
Obstetrics, visits		291	3.9
Normal	235		
With complications	48		
Extra-uterine pregnancy	8		
Throat infections		195	2.9
Influenza, bronchitis		180	2.6
Malignant disease		175	2.4
Venereal diseases		169	2.2
Gonorrhea	153		
Syphilis (primary)	10		
Chancroid	6		
Cardio-vascular-renal disease		155	2.1
Syphilis, late		154	2.1
Pyelitis-cystitis		134	1.8
Hernia (1/8 operations)		108	1.4
Osteomyelitis		97	1.3
Obstetrics, deliveries		83	1.0
Normal	62		
Cesarean section	13		
With complications	8		
Tuberculosis, pulmonary		74	1.0
Vaccination, inoculation		70	.9
Skin diseases		68	.9
Hemorrhoids		67	.9
Heart disease		64	.8
Arthritis		63	.8
Tonsillectomy		61	.8
Physical examination (life insurance)		56	.7
Contagious diseases		51	.7
Prostatitis		46	.6
Thyroid disorders		46	.6
Varicose veins and ulcers		41	.6
Infant feeding		39	.5
Pneumonia		37	.5
Tuberculosis, non-pulmonary		37	.5
*Miscellaneous, general surgery		298	4.1
Miscellaneous urological conditions		50	.6
Ear disorders, chiefly otitis media		28	.3
Eye disorders, infections, ulcers		22	.3
Nose disorders, chiefly sinusitis		19	.2
Miscellaneous diseases of childhood		18	.2
			100.0

*See list.

The visits reported by eye, ear, nose and throat specialists were about 17 per cent for eye conditions and 83 per cent for ear, nose and throat conditions. Their distribution is shown in *Table IV*, which, like all the other

TABLE IV

ANALYSIS OF VISITS—PRACTICE OF LARYNGOLOGY, OTOLOGY, OPHTHALMOLOGY, RHINOLOGY

		%
Throat infections	1093	22.5
Sinusitis (operation, 16)	619	12.8
Otitis media	525	10.9
Refraction	406	8.4
Post-operative dressings all conditions	328	6.8
Tonsillectomy	240	5.0
Deflected septum, enlarged turbinates, polyps	178	3.8
Disorders of external ear (cerumen, furunculosis)	172	3.6
Conjunctivitis (1/3 gonorrheal)	125	2.9
Foreign body in eye	110	2.5
Minor surgery	85	1.9
General medical diseases (heart, lungs, gastro-intestinal, etc.)	83	1.6
Trachoma	75	1.5
Mastoiditis (operation, 21)	70	1.4
Injury, eye	66	1.3
Corneal ulcer	59	1.2
Iritis	52	1.0
Deafness, otosclerosis	52	1.0
Cataract	44	.9
Examination for focal infection, nose	43	.8
Neuro-retinitis	38	.7
Tuberculosis, throat	35	.6
Keratitis	33	.6
Neuralgia	30	.6
Malignant disease, throat, mouth	21	.4
Glaucoma	17	.3
Syphilis (not otherwise defined) (eye)	16	.3
Urological conditions	14	.2
Lacrimal sac infection	14	.2
Contagious diseases	11	.1
Syphilis (throat)	11	.1
Syphilis (nose)	10	.1
Brain abscess	8	.1
Major surgery (hare lip, laryngectomy)	8	.1
Miscellaneous eye (chalazion, hordeolum, choroiditis, strabismus, pterygium, granulated lids, etc.)	98	2.2
Miscellaneous, throat	42	.8
Miscellaneous, ear	35	.7
Miscellaneous, nose	5	.1
		100.0

tables, must be studied in detail to get the most information out of it.

The visits reported by the urologists, as shown in *Table V*, are over 40 per cent for gonorrhea. If we add the visits for prostatitis and other conditions resulting chiefly from gonorrhea, we find that over 60 per cent of the visits the urologist has are of gonorrheal origin. Some other conditions which receive considerable attention are of relatively infrequent occurrence.

Table VI shows the analysis of the visits reported by internists. Gastro-intestinal disorders constitute over 14 per cent, influenza and bronchitis over 8 per cent. Cardio-renal-vascular disease and heart disease combined amount to nearly 16 per cent.

More than one-third of the visits reported by those specializing in pediatrics were for infant feeding, as shown in *Table VII*. Influenza, bronchitis and throat and ear diseases account for over 27 per cent more.

Table VIII indicates that those specializing in obstetrics have about twenty-five visits of one

kind or another for one delivery. Also that they have about fourteen obstetrical visits to one delivery and that only 11 per cent of their visits are for conditions that can be classed as gynecological.

Roentgenologists, according to our *Table IX*, have about one-half of their visits for roentgenograms and about one-seventh for radium therapy.

TABLE V
ANALYSIS OF VISITS—PRACTICE OF UROLOGY

			%
Gonorrhea		3803	40.2
Prostatitis		1417	16.2
Syphilis		597	6.9
Late	494		
Primary	103		
Rheumatism, gonorrheal		455	5.3
Pyelitis, cystitis		408	4.3
Stricture, urethra		347	4.1
Chancroid		258	3.0
Varicocele		158	1.9
Venereal warts		119	1.6
Calculus, chiefly kidney		82	1.4
Skin diseases		81	1.3
Urethritis, non-gonorrheal		74	1.2
Minor surgery		72	1.1
Arthritis		68	1.0
Stricture, ureter		64	.9
Tuberculosis, urogenital		60	.8
Nephritis		45	.6
Adenitis, inguinal		44	.6
Abscess, urethra		35	.5
Gynecological conditions, operations		35	.5
Granuloma inguinal		33	.5
Malignant disease, bladder, prostate, etc.		27	.4
Urethral fistula		21	.4
Major operations, prostatectomy, nephrectomy		15	.3
Miscellaneous urological conditions		256	3.0
Miscellaneous medical conditions (heart, gastro-intestinal, neuritis, throat, contagious diseases, etc.)		108	1.3
Post-operative dressings		32	.6
Operations (hernia, appendicitis, etc.)		7	.07
Obstetrics		4	.03
			100.0

Table X shows the practice of the neuropsychiatrists to consist largely of psychoneuroses, 24.3 per cent, psychoses 16.4 per cent, and cerebrospinal syphilis 15.6 per cent.

The visits reported by dermatologists as shown in *Table XI* consist largely of acne vulgaris, 72.5 per cent, and tinea, 8.8 per cent, making a total of over 81 per cent for acne and ringworm.

In conclusion, it is believed that these tables will be found useful to curriculum committees in planning curricula in the clinical branches, to the teaching staff in the clinical departments in deciding which diseases and conditions require more or less attention and to the student, undergraduate or graduate in electing subjects to which he should give special attention in order to be prepared for his practice later.

TABLE VI
ANALYSIS OF VISITS—PRACTICE OF INTERNAL MEDICINE

			%
Gastro-intestinal disorders		498	14.3
Colitis	213		
Cholecystitis	89		
Constipation	70		
Indigestion	51		
Duodenal ulcer	37		
Gastric ulcer	20		
Diarrhea	12		
Food poisoning	6		
Influenza, bronchitis		294	8.4
Arthritis		274	7.9
Tuberculosis, pulmonary		273	7.8
Cardio-vascular-renal disease		264	7.6
Heart disease		230	6.5
Minor surgery		185	5.2
Contagious disease		97	2.9
Syphilis, late		90	2.4
Pyelitis, cystitis		81	2.3
Gynecological conditions		69	2.1
Throat infections		67	2.0
Diabetes		66	1.9
Skin diseases		66	1.9
Venereal diseases		65	1.8
Gonorrhea	46		
Chancroid	13		
Syphilis (primary)	6		
Malignant disease		62	1.7
Physical examination (largely for life insurance)		58	1.6
Blood diseases		56	1.5
Malaria		53	1.4
Amoebic dysentery		46	1.3
Psychoneurosis		45	1.2
Pneumonia		45	1.2
Asthma		43	1.1
Appendicitis		40	1.0
Neuritis		38	.9
Surgical emergencies, major accidents		21	.7
Obstetrics, chiefly normal visits		21	.7
Miscellaneous medical disorders		245	7.4
Miscellaneous surgical conditions		54	1.8
Miscellaneous urological disorders		34	1.0
Disorders of childhood		17	.5
			100.0

TABLE VII
ANALYSIS OF VISITS—PRACTICE OF PEDIATRICS

			%
Infant feeding		791	36.3
Throat infection		256	11.8
Influenza, bronchitis		231	10.6
Ear diseases		104	4.8
Otitis media	76		
Mastoid	28		
Vaccinations		101	4.7
Minor surgery		81	3.8
Pyelitis		76	3.5
Pneumonia		63	2.9
Rickets		61	2.8
Skin diseases		38	1.8
Syphilis		36	1.7
Congenital	32		
Acquired	4		
Heart disease		25	1.3
Nephritis		21	1.1
Adenitis, cervical		20	1.0
Physical examination		19	.9
Typhoid		19	.9
Asthma		19	.9
Chorea, rheumatic fever		17	.7
Malaria		17	.7
Vaginitis		16	.6
Empyema		16	.6
Surgical emergency		15	.5
Tuberculosis		10	.4
Appendicitis		4	.2
*Miscellaneous		122	5.5
			100.0

*See list.

TABLE VIII
ANALYSIS OF VISITS—PRACTICE OF OBSTETRICS

			%
Obstetrics visits (about 1/3) in clinics)		1405	57.8
Normal	1244		
With complications	157		
Extra-uterine pregnancy	4		
Gynecological conditions		274	11.1
Minor surgery		112	4.5
Obstetrics, deliveries		97	3.9
Normal	50		
With complications	35		
Cesarean section	12		
Venereal diseases (½ gonorrhea)		62	3.0
Cardio - vascular - renal diseases (independent)		46	2.1
Influenza, bronchitis		44	1.9
Gastro-intestinal disorders (independent)		36	1.6
Appendicitis		34	1.4
Urological conditions (independent)		30	1.3
Tuberculosis, pulmonary (independent)		29	1.2
Contagious diseases		29	1.2
Throat infection		27	1.1
Post-operative dressings		25	1.0
Skin diseases		22	.9
Malignancy (uterus and breast)		21	.8
Pneumonia		17	.6
Miscellaneous medical disorders		91	3.8
Miscellaneous surgical conditions		16	.5
Miscellaneous nose conditions		5	.2
Miscellaneous diseases of childhood		4	.1
			100.0

TABLE IX
ANALYSIS OF VISITS—PRACTICE OF ROENTGENOLOGY

			%
Roentgenograms		449	48.3
Extremities	136		
Gastro-intestinal	103		
Chest	83		
Dental	55		
Urological	49		
Skull-spine	23		
Radium therapy		139	14.9
Face, lip, ear	59		
Gynecological conditions	46		
Breast	10		
Mouth, throat	7		
Miscellaneous	17		
Venereal diseases (½ gonorrhea)		108	11.6
Physical examination (largely for life insurance)		76	8.1
General medical conditions		72	7.8
Minor surgery		44	4.8
Skin diseases		31	3.3
Contagious diseases		5	.6
Other physical therapy		5	.6
			100.0

TABLE X
ANALYSIS OF VISITS—PRACTICE OF NEURO-PSYCHIATRY

		%
Psychoneuroses	266	24.3
Psychoses	180	16.4
Cerebro-spinal syphilis	171	15.6
Minor surgery	60	5.4
Neuritis	44	4.1
Epilepsy	43	4.0
Medical diseases, miscellaneous	37	3.5
Cardio-vascular disease	35	3.3
Conduct disorders	34	3.2
Psycopathy	31	2.8
Organic brain disease	29	2.6
Arthritis	27	2.4
Polyglandular disorders	24	2.1
Mental deficiency	23	2.0
Neurological	19	1.8
Encephalitis	16	1.4
Alcoholism	15	1.3
Paralysis agitans	12	1.1
Chorea	12	1.1
Miscellaneous	17	1.6
		100.0

TABLE XI
ANALYSIS OF VISITS—PRACTICE LIMITED TO SKIN DISEASES

		%
Acne vulgarus	971	72.5
Tinea	118	8.8
Eczema	66	4.9
Epithelioma	57	4.3
Syphilis	56	4.2
Impetigo	36	2.7
Scabies	17	1.3
Malignancy, mouth, throat	4	.2
Miscellaneous	15	1.1
		100.0

DISCUSSION (*Abstract*)

Dr. Willard C. Rappleye, New Haven, Conn.—One of the interesting facts brought out by this study is the large proportion of practice represented by a relatively few well-known disorders. The Commission on Medical Education made a similar study of the work of the general practitioner and analyzed the work from the standpoint of where it was done, that is, in the office, the hospital or the home. We found that 55 per cent was done in the office and 35 per cent in the home. This indicates that 90 per cent of the general practice of medicine is done outside of the hospital, while a large proportion of medical instruction is being carried on in the hospitals. We found also, as he did, that a large proportion of illness seen in general practice and in the specialties is due to a relatively few causes. We found that 75 per cent of office visits were for minor surgery, respiratory infections, general medical disorders and venereal diseases and that 90 per cent of home visits were for respiratory tract infections, general medical and contagious diseases, obstetrics and minor surgery.

Another point brought out by Dr. Bass is highly important from the standpoint of medical training, namely, that the large proportion of those doing a special practice must be familiar with the more general diseases. It emphasizes the necessity of getting into medical training for the specialties a great deal of sound medical training in diseases other than the specialties alone. The material presented by Dr. Bass shows that in the special practice of surgery about 40 per cent of the diagnoses are for minor surgery, gynecology and appendicitis; 60 per cent of eye, ear, nose and throat surgery is for sinus, ear and throat infections, refractions and tonsillectomies, as illustrations.

Another point of interest is the small proportion of the work of the general practitioner which is concerned with preventive medicine. Most of the demands are for the care and treatment of actual illness or for the relief of symptoms, but there is relatively little work of a strictly preventive character. It is true, however, that many of the requests for medical attention are for relatively minor complaints and these are in many instances of a preventive character. Early appropriate treatment is a highly important feature of the practice of preventive medicine. There is little apparent in medical practice of periodic medical examinations, in advice to mothers on the problems of children, physical as well as mental and emotional, and in the field of general hygiene and health advice. Practically all the visits for physical examination are for life insurance purposes. Problems of infant feeding and care are largely those of illness rather than supervision and prevention. The total amount of vaccinations and inoculations is a very small proportion of the total number probably done in the communities from which the re-

ports have come. Tuberculosis is probably much more common than is reported. That is also true of mental diseases; they are much more common than reported, as shown by the fact that they represented over 11 per cent of the causes of rejection in the draft during the War. One cannot take these statements too literally, however, because in many communities a considerable part of this type of service is done by public health agencies, clinics, state organizations and other groups.

The paper of Dr. Bass suggests again the relative value of morbidity over mortality studies in health and medical work. Many believe that the incidence of various types of disease is far more important than the mortality rate in appraising the health problems of a community. On the average, it takes a little over 100 instances of illness to account for each death in a community. The respiratory infections occur 300 times per death from that cause, whereas the cardio-vascular diseases occur only about 10 times per death from that cause. Digestive disorders occur 200 times per death. Diseases of the nervous system have a relatively low ratio. Several state boards of health are now conducting studies on morbidity and will eventually make available their results to help them in their work in community health progress.

SHOULD THE GRADE REQUIREMENTS BE HIGHER IN THE THREE MAJOR SUBJECTS, MEDICINE, SURGERY AND OBSTETRICS THAN IN THE OTHER COURSES OF THE SO-CALLED CLINICAL YEARS?*

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The title of this discussion might be interpreted in more than one way, but I have assumed that it was suggested by the overcrowded condition of the curriculum. It therefore seems to call for a study of the relative importance of certain groups of subjects in the clinical years as well as suggestions for the revision of the present policy in regard to the specialities. Such discussions are not new, for approximately fifty years ago Billroth[1] made the following statement:

"At the greater universities with large hospitals, as many special clinics may be opened for the talented specialists as may be desired. Still none of these things must be lacking in the General Surgical Clinic, otherwise the student would be compelled to visit all these special clinics in addition and would have to study for eight or ten years instead of four or five. Moreover, some of us picture the practical success of so broad a plan of instruction in far too glowing colors. The room for knowledge in the average present-day brain is, after all, pretty definitely circumscribed."

*Read in Section on Medical Education, Southern Medical Association, Twenty-First Annual Meeting, Memphis, Tennessee, November 14-17, 1927.

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It is quite obvious that the problem is much more complicated now than when the above was written. General surgery, medicine, and obstetrics have greatly increased their scope and in addition many new specialties have developed. Not only is this true, but they have assumed increasing importance in the medical curriculum. The result is a hopeless overcrowding and an apparent attempt to make "general specialists" of all medical students. However, it is generally conceded that an important function of medical schools is to produce the so-called general practitioner.

It is difficult if not impossible to decide just which should be "major" and which "minor" subjects, but there are two not included in the title of this discussion which are of great importance to the medical student, namely: preventive medicine and pediatrics. Leathers[2], in a paper entitled "The Place of Preventive Medicine in the Medical School," says:

"Notwithstanding the readjustments with which the profession may be confronted, one fact seems to stand out more clearly than others, and that is, the physician of the future should not only be in sympathy with the modern health movement, but should also be the most potent influence in the community for the promotion of public health. It would, therefore, appear that the medical school cannot make a better contribution to civilization than to train the student so that he may more clearly visualize his responsibility as a physician in the control of disease and in the betterment of individual and community health."

I am fully convinced that no subject in the medical course is of more ultimate value to the profession and public. There has been a tendency in the profession to belittle its importance so it should be stressed. The prevention of each disease should be discussed in connection with its etiology and treatment, but it is also essential to have preventive medicine presented as a systematic course, with proper laboratory facilities, during the student's final year. Hence, I believe it should be classed with the "major" subjects.

Pediatrics in its broadest sense is essentially care and prevention applied during the most important period of human development. The welfare of our future citizens depends to a large degree on the proper care and training of the child. Furthermore, a rather large proportion of the average practitioner's clientele will be made up of children and, I believe, few physicians will deny that a sick child is a very different problem from a sick adult. It, therefore, seems that pediatrics also should be given more consideration in medical education.

It might appear from the above that I am at-

tempting to increase rather than decrease the medical student's difficulties. I hasten to assure you that this is not my purpose, for there are a number of subjects occupying prominent positions in the medical curriculum which are of much less importance to the undergraduate than the two just discussed. I do not wish to disparage the importance of the so-called specialties, for the success of our present day medicine depends upon them, but I agree with Flexner,[3] Wilbur[4] and others, who believe they should be taught chiefly as post-graduate rather than as undergraduate subjects.

If we grant that they should not play so important a role in undergraduate work, the difficulty still remains as to how to decrease the time devoted to them and still retain the essentials. There are several possibilities, none of which is entirely satisfactory. The minor subjects could be listed as electives and the student required to take a certain number. This would decrease the required hours to a considerable extent and would give the student the opportunity to choose those of most interest to him. There are, however, certain disadvantages; such as the failure to observe some of the common diseases met in practice, and the failure to learn some of the really important diagnostic procedures in use in each of them. The latter is not serious, as the most common of these should be used on the medical and surgical wards.

The specialties could be evaluated by the number of session hours, making them of relatively slight importance in estimating the student's fitness for promotion. This would not restrict the scope of instruction in each one and so would fail to decrease the number of required hours. The student could devote more time to the major subjects, but at the expense of thoroughness in the minor subjects.

The honor point system as used in certain medical schools has approximately the same advantages and disadvantages as the above.

Different grade requirements might be used for major and minor subjects. This idea appears to have little to recommend it. Grades as such have slight significance and since students are often inclined to work for mere marks, it would seem that nothing should be done to increase their apparent importance. One of the cardinal principles of education is thoroughness. Because of the great mass of material to be covered and the very limited time in which this must be accomplished, there is a distinct tendency for medical students to acquire a superficial attitude. It is probable that relatively low passing grades for a group of subjects would promote such an attitude toward them. The likelihood of the development of superficiality with this method is of sufficient importance to justify its rejection. It is true it would decrease the apparent importance of the minor subjects and allow the undergraduate to devote more time to the major subjects, but this result would not justify the cost.

It is probably desirable to dispense with our strict class system and thus give the individual student an opportunity to pursue any given course or courses as long as he wishes. This will require a complete revision of our educational system and will be accomplished slowly. This method has been in use in some of the European Universities for a long time and has proved most satisfactory. It is being tried at Yale University, but not yet for a sufficient time to justify definite conclusions.

I believe the best solution of this problem under present conditions is to have all of the surgical specialties organized as sub-departments of general surgery with a very limited scope of instruction, to include only the more common diseases and the simple diagnostic procedures. There should be only one examination in surgery, with one or two questions from each sub-department. The instructors should, of course, be specialists in their respective fields and could offer more comprehensive courses as electives. In this way the student would receive the essentials for practice and the required hours would be decreased, yet one interested in a specialty would have an opportunity to obtain more intensive training.

It seemed of interest to know the method of handling this situation in other medical schools, so the following questionnaire was sent out:

(1) Have you the same passing grades for major and minor subjects?

(2) Are subjects evaluated by the number of session hours?

(3) If so, what weight do they carry in estimating the student's fitness for promotion?

Answers have been received from thirty-three medical schools and none of these has different grade requirements for major and minor subjects.

Six or approximately 18 per cent make no distinction between subjects. In ten, or 30 per cent, the specialties are sub-departments of medicine and surgery and only one final examination is given in each of these. In five schools, or 16.5 per cent, subjects are evaluated by the number of session hours and minor subjects are, there-

fore, of relatively slight importance when estimating the student's fitness for promotion. Ten schools, or 30 per cent, have no definite system, but the decisions as to promotion or graduation are based chiefly on the work done in the major subjects. Two schools, or 6.5 per cent, use the honor point system.

SUMMARY

In my opinion it would be wise to give each student more freedom in the length of time devoted to the medical course and to each individual subject. This would call for a system of general examinations; to be given at the time of the candidate's application for a degree.

Different grade requirements for major and minor subjects would not decrease the number of required hours. It would stress the importance of certain subjects, but would violate one of the basic principles of education and, therefore, should be considered inadvisable.

Under our present educational system and licensure requirements, the specialties should be grouped as sub-departments of medicine and surgery, with the scope of instruction under the supervision of the heads of these major departments and with only one examination for each main division. Under this system the less important subjects would not be overemphasized and yet each student would obtain the essentials for practice.

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SHOULD THE GRADE REQUIREMENTS BE HIGHER IN THE MAJOR THAN IN THE MINOR CLINICAL SUBJECTS? AN INTERNIST'S POINT OF VIEW*

By CHARLES T. STONE, M.D.,
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The division of medical teaching in the third and fourth years of the medical curriculum into instruction in the three major clinical subjects, medicine, surgery and obstetrics on the one hand, and the minor medical and surgical specialties such as ophthalmology, otolaryngology, pediatrics, neurology and psychiatry, urology, dermatology, and syphilology and others, on the other hand is almost universally established. As a rule medical schools draw a sharp distinction between the major and minor courses in their catalogue announcements concerning the teaching given in the different subjects. Naturally a larger part of the time in the so-called clinical years goes to the major subjects, with a comparatively small number of prescribed hours for the specialties. There is, however, abundant opportunity for the exceptional student to do extra work in the minor courses in which he may be especially interested, but the main question as to the propriety of equal grade requirements for major and minor subjects is not concerned with extra curricula work.

The truth is that we very conspicuously demarcate the major from the minor clinical subjects in every particular save the single one of grade requirements. Would it be better to increase the grade requirements in the major subjects above the percentage now generally obtaining and leave those in the minors at their present level, or would a better plan be to lower the level in minor subjects without changing the major subject requirements? Or finally is the whole question of so little importance, or is it so fraught with unpleasant and perhaps even demoralizing possibilities, that a change would be untimely or unwarranted?

I must confess that when the question was at first proposed, my reaction was not marked in either direction; the initial feeling was one of neutrality amounting almost to apathy. However with deliberation over the subject, the idea developed that it is not quite right from the standpoint of either the major subject teacher, the minor subject teacher, or the student for there to be an equality in the grades required by the major and minor departments.

In taking this position, I have done so after due consideration of the importance of the instruction given in the minor subjects. As an internist, I could not be unmindful of the usefulness to the future practitioner of the ability to make fundus examinations, to do inspections of ear drums, to recognize the common skin manifestations of systemic disease, or to perform other equally useful procedures taught in special subjects and in fact to appreciate the relationships existing between the diseases seen in special and general medicine.

Then, too, since the majority of graduates of medical schools go into general practice, at least

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for a time, it seems more proper that the greatest emphasis should be placed upon the three major subjects in undergraduate teaching with the minor subjects furnishing what is needed of them in order to fit the graduate for his work. Should a specialty later be decided upon, of course, all attention would be focused upon obtaining a high degree training and skill in the chosen field. Viewed from this angle then it would certainly be logical to lower the standard of grades required by minor subjects in undergraduate teaching, as compared with the requirements of the major subjects.

All who are engaged in teaching recognize the need for revision of and experimentation with, teaching curricula from time to time in order that they may keep pace with the advancement of knowledge in various departments of educational effort. Especially is this true in a subject like medicine in which much still remains to be discovered and where ideas are constantly undergoing modification or complete transformation with the addition of new facts, resulting from a vast amount of original investigation. With these changes pedagogical methods must frequently be altered. Dr. Christian, of Harvard, speaking on this subject, before this section on Medical Education at the Atlanta meeting last November, stated that he believed the curriculum of medical schools should be revised at least every four years or oftener. It is to the credit of medical education that more changes have been wrought in its teaching, than in that of any other branch of education. But have we kept changes in grade requirements abreast of the other innovations? Apparently we have not.

It is also general opinion that the method of giving instruction in a subject for a certain length of time, and then conducting an examination over the material taught, and finally evaluation of the student's knowledge of the subject in percentages has serious objections. In the first place the student who chooses to do so can by a cramming process make a fairly decent grade, while others who have labored more faithfully may make a less imposing grade. Now in the minor subjects, particularly, the tendency is to neglect the whole thing until near the end of the course of instruction, when suddenly all effort is for a time concentrated on learning enough of the particular subject to obtain a favorable grade for passing. During such a period of preparation for these examinations the student discontinues interest in his more vital problems in the major subjects, thus losing precious time for study in fields where it is most needed. If the grade requirements were less exacting in the minor subjects and the teaching in them limited to the essentials that bear with special emphasis on general medicine, would not the student be able to spend more time on his more essential work, and would not the end product of our medical schools be as well off if not better for the change?

Also, it is constantly being recognized as necessary and advocated as desirable that students be granted more time from actual scheduled teaching hours, for recreation, collateral reading, special work, investigation, and other activities in which they may be interested. All departments of teaching in the medical school should cooperate in the process of concentrating their prescribed hours so that free time for the student is allowed. This is fundamental, but if students were required to make less for passing grades in their minor courses still more time might be added to the open hours.

The old idea that each student must have stuffed into him all knowledge there is to be had about every subject taught in the whole medical school is no longer tenable or even remotely possible of attainment. It is possible, however, to give the student by the time of his graduation a sufficient assembly of basic principles, a sane, though necessarily incomplete, insight into medicine, and a stimulation of his natural curiosity about facts unknown to insure his continued study and investigation after practice has begun. With these fundamentals assured the success of the efforts of medical education can not be doubted. I believe that by requiring less of our students in their minor courses, especially in regard to hours taught and grades required the accomplishments of these ideals might be fostered. That it might thereby be retarded does not appear at all probable.

Let us consider for a moment the effect of lowering the grade requirements in the minor subjects from the standpoint of the teachers of those subjects. In the first place, such a change would in no wise lower the dignity of their courses. Such courses are admittedly minor in other respects. Why should they not be so in grade requirements? Then, too, the teachers would not be so much in the plight of a well known professor of many years experience in teaching a minor medical specialty who said that he had difficulty in giving an examination in his subject easy enough for his students to pass. Some minor subject teachers tell one frankly that they would not bar a student from graduation by reason of a failure in their examinations. So it

appears that a reduction in grade requirements in the minor subjects would not offend the feelings of our colleagues who teach those subjects. On the contrary, I am strongly of the opinion that they would welcome the change. If I am in error they will correct me.

If such a lowering of grade requirements for minor subjects be obtained, the teacher of the major subjects would feel that the students were coming to him knowing what they should of the minor subjects without having wasted much time on the non-essentials. He would also know that when the student, who later as practitioner, comes across special diseases or special complications of general diseases he would not be hesitant in calling his specialist colleagues in consultation, which is as it should be. He would also feel that the student interested in the general field of medicine would have more abundant opportunities for fitting himself for better service in the branches of the medical sciences which he would practice most, and that the unusual or exceptional student interested in one of the major subjects or perhaps in clinical investigation, would be in a better position to develop himself for the sphere in which he is best fitted.

Viewed from the student's outlook on this question, it seems reasonable to suppose that he would contemplate with favor reducing the grades required of him in minor subjects, and perhaps in the majors, too, for that matter. But if his minor subject grades were less exacting he would have the feeling that one of the long standing "necessary evils" of the medical curriculum had been removed. Many students have been caused to remain in school one or more years longer than the customary four years because of trivial failures in minor subjects. This is hardly just, because the cost of an extra year in the medical school is considerable, and besides medical students at best must begin their life's work already comparatively far advanced in years. After all, if a young man as a student has the qualifications necessary to make him a good physician in later years, it matters little whether his grade in some minor course was 60 or 90 per cent, when he was a fourth year medical student. Admittedly, the minor subjects are in practically every instance specialties, and the student rather naturally feels that if he decides to take up a specialty later on he will go through somewhat the same procedure in preparation for the specialty as did his teacher of the specialty in the medical school. Therefore, during his undergraduate days he feels that less should be expected of him in special subjects than in medicine, surgery, or obstetrics.

And so, having been requested by the Chairman of the Section to present an internist's point of view on this question, I have endeavored to give you my ideas regarding the subject. After due consideration it appears sound in principle, and probably wise and just in practice that the grade requirements in the three major clinical subjects, medicine, surgery, and obstetrics should be higher than in the minor clinical specialties, or stated another way, the grade requirements in the minor clinical subjects should be less than in those of major rank.

REVIEW OF ACTIVITIES OF A COUNTY HEALTH DEPARTMENT*

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In presenting a review of the activities of the Shelby County Health Department we do not presume to recommend its program as ideal. There are, obviously, many defects at the end of its first year's existence under the present organization. But our purpose is to discuss very briefly some local conditions and to show some of the work that has been done.

Shelby County lies along the Mississippi River at the corner of the states of Tennessee, Mississippi and Arkansas. Its surface varies from the low level areas along the river to the slightly hilly sections of the eastern side. It is trav-

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ersed by three streams of considerable size and a number of smaller ones. Its soil is of a silty clay and is practically impervious. Exclusive of the City of Memphis (which has its own health department) the area is 776 square miles and the total population about 125,000, 42 per cent of whom are white and 58 per cent colored. A large percentage of the population is concentrated in the thickly settled area immediately adjacent to the City of Memphis. There are six incorporated towns varying in size from 250 to 1,000 inhabitants.

The assessed property valuation is $247,000,000; the tax rate 2¼ mills; and the budget of the Health Department proper about $35,000.

The government of the county is different from that in the average Tennessee county, in that, in addition to the usual county court there is a board of three commissioners which is in continuous session and which administers many of the most important affairs of the county, including the Health Department. These commissioners are wide-awake, progressive men. The Commissioner of Health, Col. W. J. Bacon, is intensely interested in the Department, and, in public health matters, is one of the best versed laymen that I have ever met. He has never refused us anything and has not limited us to a definite budget. He has frequently taken active part in educational campaigns. Previous to the reorganization, the county health officer had given only part of his time to the work. As good results as could be expected were realized under this arrangement, and two or three good pieces of work had been started in the County more or less independent of the Health Department. When the Department was reorganized all official agencies were combined, a few changes and some additions to the staff were made from time to time until at present we have a personnel of two physicians (in addition to the Health Officer), four nurses, five sanitary officers and two stenographers. Besides this regular personnel there are one or two special inspectors and a group of laborers, the number of which varies from time to time.

The County has a very progressive system of consolidated schools with a county superintendent and a corp of teachers, who are thoroughly sold on the importance of public health and who have shown a most splendid spirit of cooperation with the Health Department.

The Shelby County Tuberculosis Society, which has been active in the County for several years, has also shown a fine spirit of cooperation.

In mapping out a program for our first year's work, the problems that seemed in most urgent need of attention were given first consideration. Malaria control work, sanitation, school hygiene, communicable disease control, tuberculosis and maternal and infancy work have, therefore, received greatest attention.

In addition to controlling an area of 35 square miles adjacent to Memphis, oiling for mosquito control has been done at twenty-one villages and small towns located in all parts of the County. Approximately 125 square miles of County area, exclusive of Memphis, is under intensive malaria control by oiling, ditching, paris green, and by the use of top minnows. Five-sixths of the total population is benefited by this work.

Oil has been our chief weapon. Two trucks with crews of five men each were kept busy during the oiling season collecting, distributing and applying oil. During the winter one truck was used to collect and store oil in four steel storage tanks of 40,000 gallon capacity provided for that purpose. The oil is given to us by the garages and the expense of collecting it is about 1.6 cents per gallon. Approximately 55,000 gallons of this oil was used during the past season. This work had been carried on in the County for a number of years by Mr. H. G. Tuggle, who is now our Chief Sanitary Inspector.

In the spring of 1926 a crude scavenger system, which the County had been operating at public expense in the Memphis suburban area for several years, was placed under Mr. Tuggle's supervision. He soon began, in the face of much criticism, to advocate the installing of pit privies in this area and had succeeded in getting the work well under way when we organized in October, 1926. This work has been vigorously prosecuted throughout the year. More than 95 per cent of the area has been sanitated. A total of 10,800 privies have been installed and the scavenger equipment has been reduced from 19 carts and 4 wagons to a single truck, which is operated only part of the time. The cost of operation has been reduced from approximately $40,000 to $5,000 per annum.

In the summer of 1926 Dr. C. W. Polk had been employed by the County Commissioners, cooperating with the Board of Education, to work in the County schools. In October this work was placed in our Department and Dr.

Polk was retained to carry it on. Complete physical examinations were given 9,033 children, 5,041 corrections are known to have been made, nutrition classes have been organized in every white school and immunization campaigns against smallpox, typhoid fever and diphtheria have been waged. These campaigns have not been confined to schools, but have included both adults and pre-school children. A total of 8,834 persons have been immunized against smallpox, 7,364 against typhoid fever, and 4,096 against diphtheria.

Previous to July of the present year we did not enter the field of tuberculosis work, as the Tuberculosis Society had field workers in the County, but a cooperative scheme was worked out with the Society whereby our nurses organize and work up clinics and the Society furnishes a physician to do the examinations. Since July we have examined 930 persons, found 87 positive cases of tuberculosis, and 201 nursing visits have been made.

Maternity and infancy work has consisted chiefly of field visiting by the nurses. Eighty-four cases have received attention and 100 visits have been made.

Early in the year we purchased a moving picture camera and have made pictures of a number of our activities. We find them very interesting, not only to officials but to the public in general. There is no better way to gather a crowd and elicit the interest of a community than to show a local picture.

We now wish to conclude this number by presenting a few of these films.

DISCUSSION (*Abstract*)

Dr. John A. Ferrell, Rockefeller Foundation, New York, N. Y.—When we consider that 10,000 sanitary latrines have been constructed in a single county in a short period of time, we wonder if Henry Ford will not be investigating this rival in the application of the principle of quantity production. Likewise the other evidences of applying public health service in a wholesale manner present a remarkable achievement.

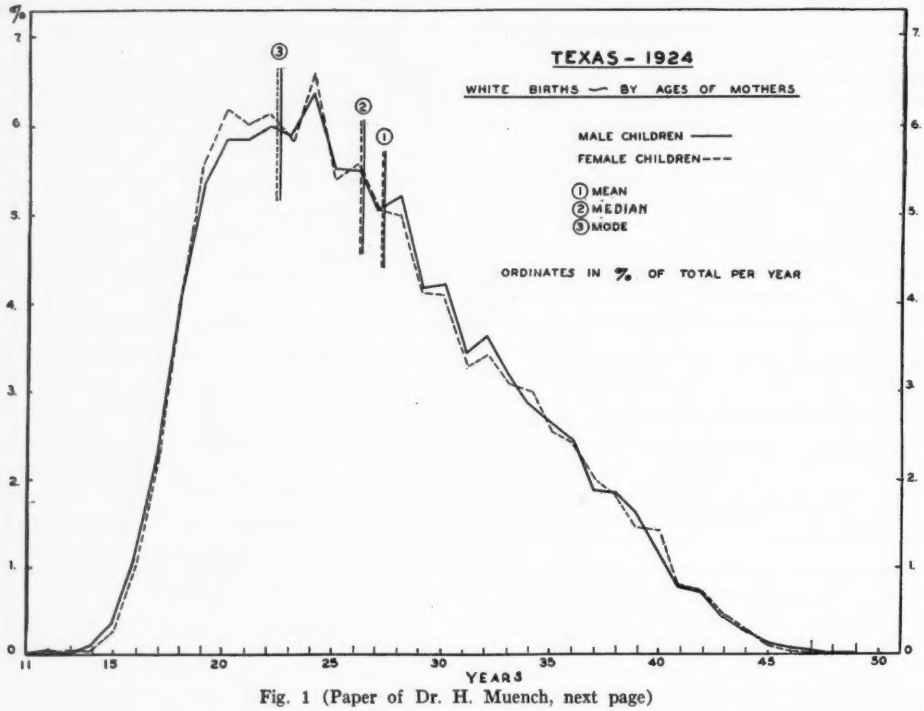


Fig. 1 (Paper of Dr. H. Muench, next page)

AGE OF MOTHER AND SEX RATIO OF CHILDREN*

By H. MUENCH, M. D.

From The Rockefeller Foundation, New York, N. Y.

It is not unusual to find in publications, both scientific and popular, statements regarding variations in the sex ratio of children of mothers of different ages. As the writer ran across such a statement † at a time when he had access to birth records already punched on Hollerith cards, he determined to tabulate a series of births according to sex of child and age of mother to see whether any tendency to change in sex ratio could be found.

For this purpose, all available cards for births in the State of Texas during the year 1924 were classified. Only the white population was used, excluding "colored," "Mexican" and others, to keep the field as uniform as possible. This gave a total of 52,851 live births. Unfortunately, many female births for the month of January could not be found, so that the total sex ratio is not correct. In addition, cards had been filed according to the date the report was received, and not according to the date of the birth, so that monthly variations meant nothing, nor was exactly one year included. For the purposes of this study, however, these discrepancies do not affect the result.

The data obtained are given in *Table I* and are plotted in *Figure 1*. Cursory inspection of the figure shows the close approximation of the two sets of births and the general similarity of the distributions to skew probability curves. Very marked, also, are the peaks in even years of mothers' ages, but the greater concentration at ages which are multiples of five usually observed in census data are not apparent. For purposes of comparison, each curve is plotted in percentages of its total per year.

The first procedure to show divergence of the two sets of data is the chi-square test. The data were set up in two-year age groups for the purpose of the test. In this case, χ^2 is 18.621, $\frac{\eta}{\chi}$ is 21, and $P = 0.547$, meaning that there is more than an even probability that the differences between the two series are due purely to chance. This test practically disposes, as far as this study is concerned, of any possibility of finding influences of age on sex ratio.

Since the work outlined in this paper was performed, the Statistical Bulletin of the Metropolitan Life Insurance Company for July, 1927, cited the accumulated figures of the United States Census Bureau for eight years, showing a definitely higher sex ratio in children of mothers under 15 years of age as compared with mothers over fifteen. The figures of the present study, arranged as a fourfold table, separating mothers under from those over fifteen, gives a P (chi-square test) of 0.488, or slightly less than that for the entire distribution. This is still far from a significant variation.

Owing to the similarity of the curve (*Fig. 1*) to a skew probability distribution, an effort was made to fit both series of data with such a curve by the method of moments. The data were again arranged in two-year age groups. Corrected moments and the chief constants obtained from each series are given in *Table I*.

The mean or average age for mothers of boys was $27.16655 \text{ years} \pm 0.026147$, while that for mothers of girls was 27.13958 ± 0.027712. The difference between the two means therefore is 0.02697 years while the probable error of the difference is 0.039101. The difference, then, is insignificant.

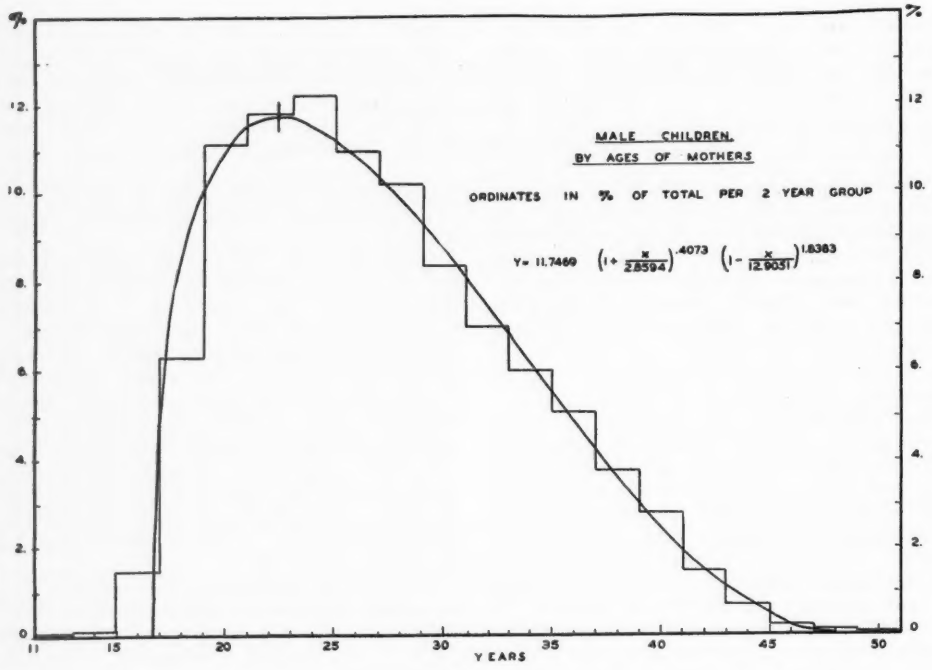
The median age (the point before which and after which half the births occur) of mothers of boys was $26.2497 \text{ years} \pm 0.03277$ and that of mothers of girls 26.1446 ± 0.03473. The difference, 0.1051, is 2.2 times the error of the difference, 0.04775. This much variation could occur once every 7 + trials by chance, and so cannot be regarded as significant.

The modal age, or age when most births occur, for mothers of boys was 22.43542 years ± 0.11584 and for mothers of girls 22.27883 ± 0.13023. The difference, 0.15559, is smaller than the probable error of the difference, 0.17429, and is therefore not significant.

None of the three main constants therefore shows a difference which could be regarded as significant. It is possible to have all of them identical and still to have one distribution

* Received for publication August 17, 1928.

† Wall, O. A.: Sex and Sex Worship, pp. 60–61. C. V. Mosby Co., 1922.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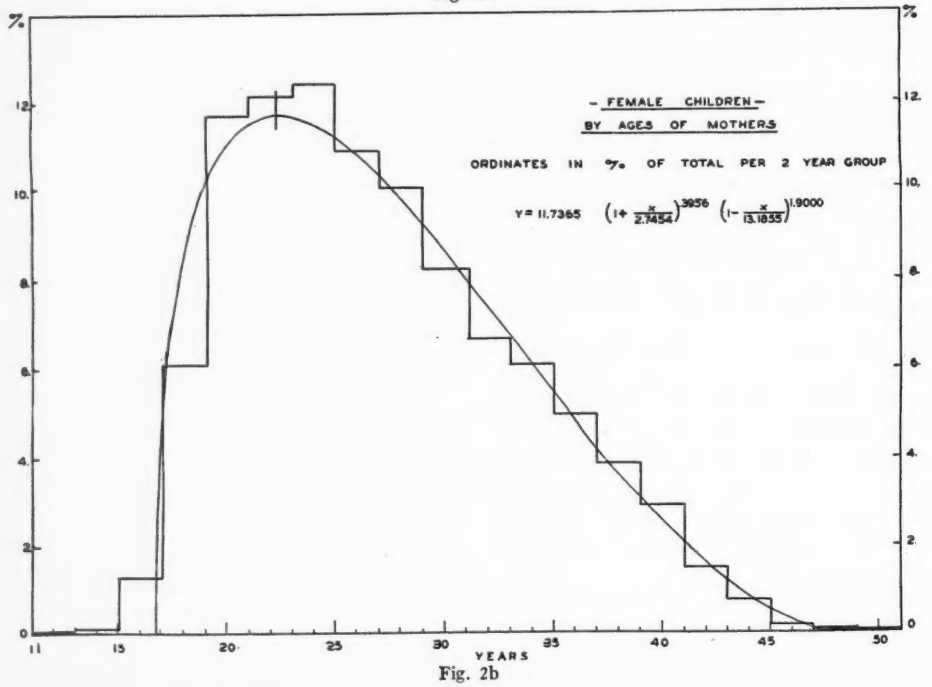
YEARS
MALE CHILDREN.
BY AGES OF MOTHERS
ORDINATES IN % OF TOTAL PER 2 YEAR GROUP
Y= 11.7469 (1+ x/28594)^.4073 (1- x/12.9031)^1.8383

Fig. 2a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YEARS
- FEMALE CHILDREN -
BY AGES OF MOTHERS
ORDINATES IN % OF TOTAL PER 2 YEAR GROUP
Y= 11.7365 (1+ x/27454)^.3956 (1- x/13.1855)^1.9000

Fig. 2b

heavier towards the ends while the other is grouped more around the center, but in this case there would be a significant difference in the standard deviations of the distributions as well as in the constant β_2 which measures kurtosis (the "flatness" or "sharpness" of the curve). As a matter of fact, σ (male) is 6.48034 years while σ (female) is 6.48434—almost identical. β_2 (male) is 2.52846 ± 0.013517 and β_2 (female) 2.56444 ± 0.014998. The difference, 0.03598, is only 1.78 times the error of the difference, 0.02019, and is not significant. The values of β_2 show that the curves are markedly "platykurtic," or flatter than the normal probability curve.

The relation between the constants β_1 and β_2 places both distributions in the class where Pearson's type I_1 curve is applicable, and this type was accordingly fitted. The curves are shown in *Figures 2a* and *2b;* they are on the basis of percentages of total in each two-year group for purposes of comparison. The formula for the male series is:

$$y = 11.7469 \left(1+\frac{x}{2.8594}\right)^{0.4073}\left(1-\frac{x}{12.9051}\right)^{1.8383}$$

and that for the female

$$y = 11.7365 \left(1+\frac{x}{2.7454}\right)^{0.3956}\left(1-\frac{x}{13.1855}\right)^{1.9000}$$

where x is in groups of two years and y in per cent of total per group. The formulæ are almost identical, as was to be expected. Comparing the curves obtained with the plot of the original data, it is seen that a fair fit is obtained for the higher ages, but that the curve is too low at ages around the mode and allows for no births under about 17 years. According to the chi-square test, the fit is very poor. Other types of Pearson's curves give even poorer results.

DISCUSSION

Although an analysis of all births in the United States Registration Area over a period of eight years does show a significantly higher sex ratio in children of younger mothers, this is not apparent in the Texas data. There may be a concealed classification in the former statistics. Since all births are included, it may be that the inclusion of some racial groups with peaking of births at low ages and a high sex ratio for all ages would produce the variation noted.

The white population of Texas is perhaps as nearly uniform as any which can be found in the Unites States. The percentage of foreign-born is very low, and the great majority of the people are descendants of several generations of native-born, mainly of Northern European origin. Texas is still largely a state of farmers and pioneers, and early marriage and childbearing are a feature of pioneer and rural life. The generally warm climate contributes to the early maturing of women and helps concentrate births at low ages of mothers.

The fitting of probability curves to data of this kind has no direct value, particularly as it was immediately shown that the distributions of male and female births are not significantly different for this study. The curves should, however, be useful as a basis of comparison with similar studies of birth distributions for other races and for white mothers in other sections of the United States.

Interesting is the number of births found at very low ages. As a matter of fact, many births were found on cards punched for *Age 10;* considerably more than at 11 years. Suspicions being aroused, it was found that the age of the mother on several of these certificates was given as "unknown," which was supposed to be punched as "00" and was punched "10" by mistake. Therefore, all births at *Age 10* were discarded. It is possible that similar mistakes occurred in punching *Age 11*, but the births at eleven years of age fit smoothly into the rest of the data. Several 11 year ages were checked and found to be correct.

Possibly the form of the curve indicates that births under, say, 17 years of age, are not properly part of the field of study, but are rather chance phenomena. At any rate, the ages from 17 to 50 include the great bulk of the births, and are apparently the measure of the fertile years of the women in this group.

SUMMARY

(1) 52,551 birth records of white children in Texas, as nearly as possible including the year 1924, were analyzed by sex and by age of mother to determine any possible variation of the sex ratio with the mother's age.

(2) The chi-square test showed a "P" of 0.547 between male and female births for the entire series; in other words, no significant variation. A fourfold table, separating mothers fifteen years old and over from those under fifteen, gave a "P" of 0.48842.

(3) On inspection, the distribution of births by ages seemed to follow closely a skew probability curve for both sexes. A Type I_1 (Pearson) curve was therefore fitted by the method of moments. The curves were a fair fit for ages from 25 onwards, but below this age showed discrepancies. There was no significant difference between any of the constants of the two curves.

(4) The main constants for both curves were: Mean, or average age of mothers at birth of children, about 27.15 years.

Median, or age before which and after which half the births occur, about 26.2 years.

Mode, or age when most births occur, about 22.35 years.

(5) It is suggested that the constants of such a curve might prove useful in analyzing the differences between various races and population groups.

CONCLUSIONS

On the basis of the data collected, it appears that the sex ratio of children is the same at various ages of mothers. The peak of fertility of white women in Texas seems to be at a rather early age, which may be due to the warm climate as well as to the pioneer conditions still obtaining throughout much of the state.

Rio de Janeiro, Brazil, April, 1928.

TABLE I—BIRTHS BY AGES OF MOTHERS

	Male		Female	
Age	*Number*	*Per Cent*	*Number*	*Per Cent*
11	3	0.01	4	0.02
12	8	.03	2	.01
13	0	.00	10	.04
14	30	.11	15	.06
15	102	.37	73	.29
16	309	1.11	255	1.02
17	654	2.34	552	2.22
18	1,105	3.95	964	3.87
19	1,484	5.31	1,386	5.57
20	1,634	5.85	1,535	6.16
21	1,636	5.85	1,498	6.01
22	1,675	5.99	1,527	6.13
23	1,639	5.87	1,442	5.79
24	1,785	6.39	1,649	6.62
25	1,534	5.49	1,342	5.39
26	1,538	5.50	1,381	5.54
27	1,404	5.02	1,256	5.04
28	1,458	5.22	1,245	5.00
29	1,168	4.18	1,027	4.12
30	1,178	4.22	1,022	4.10
31	956	3.42	815	3.27
32	1,022	3.66	848	3.41
33	887	3.17	771	3.10
34	792	2.83	742	2.98
35	731	2.62	636	2.55
36	683	2.44	603	2.42
37	528	1.89	501	2.01
38	517	1.85	459	1.84
39	446	1.60	367	1.47
40	331	1.18	355	1.43
41	216	0.77	194	0.78
42	199	0.71	177	0.71
43	122	0.44	111	0.45
44	81	0.29	76	0.31
45	43	0.15	37	0.15
46	26	0.09	13	0.05
47	13	0.05	6	0.02
48	2	0.01	6	0.02
49	3	0.01	4	0.02
50	0	0.00	1	0.00
51	2	0.01	0	0.00
	27,944	100.01	24,907	99.99

Constant	*Male*	*Female*
μ_2	10.49870	10.511732
μ_3	17.86392	18.63137
μ_4	278.69322	283.361134
β_1	0.275759	0.298859
	±0.0069402	±0.0077769
β_2	2.52846	2.564435
	±0.013517	±0.014998
σ	6.480343	6.48434 yrs.
d	4.73213	4.860746 yrs.
χ	0.73023	0.749613
χ	0.004035	0.004273
κ	−0.128163	−0.139800
r	4.245587	4.295653
b	15.764469	15.93094

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DR. M. Y. DABNEY, Editor
C. P. LORANZ, Secretary-Manager

Vol. XXI DECEMBER 1928 No. 12

EDITORIAL DEPARTMENT

THE ASHEVILLE MEETING

The sun smiled in the "land of the sky" throughout the convention period of the Southern Medical Association. Clear, crisp days enhanced the good spirits of the Association's guests and greatly facilitated attendance at all the gatherings. The general arrangements as usual were planned for the greatest convenience of all. Section meetings, general meetings, clinics, scientific and technical exhibits were housed close to the Convention hotel headquarters. The crowds were very adequately divided and handled by Asheville's numerous luxurious hotels.

The clinics of the opening day at Oteen, the Government tuberculosis hospital, were a liberal education in this disease. The clinics by the local profession Monday afternoon were of very practical value. The general clinics arranged by the President, Dr. William Ray Bathurst, were of an unusually stimulating quality. The President's address upon "The Promotion of the Common Welfare: The Aim of Modern Medicine," and the Orations on Medicine and Surgery furnished an evening of keen intense interest to all. The section programs which were carried out on Wednesday and Thursday exhibited the talents of the medical profession of the advancing South in no mean light.

SCIENTIFIC EXHIBITS

The scientific exhibits surpassed themselves in variety and elaborateness of execution. An extensive display of colored plates of leprous conditions from the Government leper colony at Carville, Louisiana, presented by Dr. O. C. Denny, was awarded first prize. The second prize went to an exhibit presented by Dr. C. N. Kavanaugh, of Lexington, Kentucky, upon tularemia, a disease which has lately assumed considerable importance in some sections. The history, early and late symptoms, bacteriology, modes of transmission and diagnosis, and prevalence of the disease in Kentucky, were very fully expounded.

A full display of neoplasms of the urinary tract, which won third prize, was shown by the Crowell Urological Clinic, Charlotte, North Carolina. Photographs of conditions of the vermillion border of the lips, by Dr. Bedford Shelmire, Dallas, Texas, received honorable mention. There were numerous other exhibits of interest and value. The exhibits of Dr. Denny and Dr. Shelmire were part of a very extensive and well presented exhibit from the Section on Dermatology and Syphilology.

TECHNICAL EXHIBITS

The technical exhibits were unusually elaborate and of educational merit. The newest in medical books, surgical and other instruments, x-ray and actinic ray machinery, hospital equipment, drugs and foods were displayed and elucidated by capable representatives. Nowhere in any field is competition so keen and the effort to keep up so great as among the manufacturers of products for the rapidly changing needs of physicians. He who understands the tools of a profession is in a fair way to understand also its methods. Careful observation and study of the newest tools of the profession will add greatly to the general information of any practitioner.

SOCIAL ACTIVITIES

The social activities attendant upon a conference of good Southerners were unusually delightful. The women guests of the Association were charmingly entertained by the hospitable wives of the members of the Buncombe County Medical Society. The men also had many pleasant gatherings. The opportunity to renew old acquaintances and establish new ones upon an agreeable basis was pleasant for all. The perfect weather made golf and trap shooting thoroughly enjoyable pastimes. Full report of the tournaments with handsome trophies awarded will be given in the January issue.

OFFICERS

Dr. Thomas W. Moore, Huntington, West Virginia, was elected President, Dr. Paul H. Ringer, Asheville, First Vice-President, and Dr. Felix J. Underwood, Jackson, Mississippi, Sec-

ond Vice-President of the Association. Complete roster of all officers, general and of the sections, will appear in the January issue.

The Association has reached a period of some real maturity since its last post-war visit to Asheville nine years ago. The Association may congratulate itself and thank its Asheville hosts for another instructive and successful meeting, which has passed any individual's expectations.

SELF-SELECTION OF DIET BY NEWLY WEANED INFANTS

The above is the title of a rather original experiment upon infant feeding, an art which was for years purely empirical and even today contains much of old wives' lore. Discarding the doctrine which has held sway since the beginning of pediatrics that the transition from liquid to solid food must be gradual, and that each article must be cautiously added to the infant's feedings, Dr. Davis[1] has administered to normal babies at the period of weaning, or at from six to nine months of age, all the normal food materials of an adult dietary. No food mixtures such as custard, soup or bread were offered. Dishes containing the various separate materials were placed on a tray before the child who ate alone to avoid the example of older children or adults. Only naturally occurring unmixed foods were used, unseasoned, and unaltered save that all were finely cut, mashed or ground, and some were simply cooked without loss of soluble substances. A wide range of the commonly used foodstuffs was offered: milk, muscle and glandular cuts of meat, whole cereals, fish, fruit, vegetables, eggs, plain and sea salt, and the infant was allowed to choose what he wished of these. Wheat and oatmeal were used raw and cooked as were beef, bone marrow, carrots, pear, and cabbage.

The three infants of the experiment had good appetites and were omnivorous. They showed no signs of indigestion or constipation. They rarely ate more than three solid foods at a meal. One who showed signs of rickets at the beginning of the experiment received a saucer of cod liver oil on his tray and partook of it generously for some months until his rickets was healed. It was observed that the infants might eat from one to seven eggs at a meal, or none, or from one to four bananas. Waves of eating a particular kind of food were common and became known in the hospital as "egg jags," "meat jags," or "cereal jags." Symptoms of over-eating or disgust with the food did not follow. At the end of the experimental period of six months in the case of two infants and one year in the case of another, all were in an excellent state of nutrition.

The immediate effects appeared to equal, at least, the best results obtained by commonly prescribed diets, in growth, weight, bone development, musculature, general vigor and appearance of health and well-being.

The conclusion was reached that a self-selected diet of simple natural foods offers a safe means of dietary experimentation with breast-fed infants of weaning age. Support was not given to the prevailing belief that infants of this age cannot digest any of the simple natural foods of adult life, or that gland or muscles cuts of meat which have been shown to be especially valuable in the variety and combination of their amino acids should be excluded from their diet. The infants could select their own foods in quantities adequate for maintenance. In eating they were governed not only by their caloric needs, but showed definite preferences which changed from time to time and were unpredictable.

Systems of artificial feeding and of feeding after weaning have suffered wide changes in the last hundred years, and in no field of medicine have greater advances been made. If one reads the directions for weaning of a popular work of a hundred years ago on "Children" by "the adjunct professor of midwifery in the University of Pennsylvania"[2] one finds little about the normal infant as compared with the large section on this subject in pediatric text books of today. Dewees,[2] the author of this work, in 1829, says that the proper diet of a child is substantially milk with farinaceous matter such as arrow root, rice, or biscuit. After a few months, provided it has teeth, it will be useful to accustom it to a little animal food. One of the popular recommendations for infants of his period was a soup made of yolk of eggs and well fermented strong beer.

Holt and Howland,[3] in 1911, again, recom-

1. Davis, C. M.: Self-Selection of Diet by Newly Weaned Infants. Amer. Jour. Dis. Child., 36:651, Oct., 1928.

2. Dewees, W. P.: A Treatise on the Physical and Medical Treatment of Children, Third Ed. Philadelphia: Carey, Lea & Carey, 1829.

3. Holt, L. E., and Howland, John: Diseases of Infancy and Childhood, Sixth Ed. New York: D. Appleton & Co., 1911.

mended that the diet of a healthy child during the second year should consist mainly of milk and some farinaceous food with bread, a small amount of animal food such as beef or mutton, beef juice and fruit juice or cooked fruit. "It is of the utmost importance that transition from a purely fluid diet to one of solid food should be made very slowly." One may begin, for instance, with white of one egg slightly cooked and later give the entire egg. At fourteen to eighteen months the child may have a small quantity of oatmeal or hominy. Potato should be deferred till the child is nearly two. Forbidden to a child under four years are goose, duck, game, kidney, liver, meat stews, lettuce, tomatoes, egg plant, green corn, nuts, salads, jelly and bananas.

Needless to say, the last fifteen years of pediatrics have greatly extended the dietary of Holt and Howland. A much wider variety of foods is now offered very young infants, as it is realized that cleanliness, simplicity, fineness of division and freedom from bacterial contamination are the most essential factors in any selection of foods.

It would be inexpedient to practice Dr. Davis' experiment, described above, upon the average child. Much trouble in the arrangement of the materials and waste of the items not chosen by the infant would result from her routine. Also, the infant reared on such a dietary might be difficult to please later at the adult table. However, it is demonstrated that the infants in question showed a discrimination which is not usually accredited them in the selection of food for maintenance. Much may yet be learned of the needs of adult nutrition through allowing infants without adult example or prompting to choose from a mixture of simple foodstuffs.

INTESTINAL ABSORPTION OF FOREIGN PROTEIN AND INSULIN

The intestinal wall forms an efficient barrier between the normal blood stream and the many foreign substances which enter the digestive tract through the oral cavity. Although some normal absorption of foreign protein has been reported,[1] in general and for all practical purposes one may consider that the normal intestine under ordinary conditions is not penetrated by foreign protein.

If the intestine is injured by ingestion of ox bile on a fasting stomach, foreign protein passes through it, according to Besredka and Plotz,[2] who have used this fact with some success as a basis for a method of oral vaccination. Typhoid vaccine, for instance, is ingested following ox bile and immunity apparently obtained to the disease.

Guyer and Claus,[2] of the University of Wisconsin, investigated the occurrence of specific precipitins in the blood of rabbits who had ingested bile and a foreign protein. An extract from the lens of calves, beta-crystallin, was used as protein or antigen. The blood of the animals, before the test, showed no precipitin for beta-crystallin. The animals were kept without food for twenty-four hours. Inspissated ox gall in ten volumes of water was then given by stomach tube, followed by oral administration of beta-crystallin. This was repeated every third day for three feedings. In ten days all the animals gave positive tests for precipitins to beta-crystallin. The two controls were negative. The animals had thus been immunized to the protein given by mouth, which was demonstrated to have passed through the intestinal walls into the blood stream.

It was then attempted to determine whether insulin also could pass into the blood stream through the intestine after ingestion of ox bile. The possibility of oral administration of insulin again loomed on the medical horizon. The results were negative for rabbits, since these animals showed no reaction after orally administered insulin and ox bile, and no fall of blood sugar. The experiment was repeated on six guinea pigs, five of whom died apparently from insulin reaction.

These are matters of physiological interest only, though oral vaccination is practiced against the intestinal diseases in some quarters. In human beings, subcutaneous vaccination against the typhoids has been satisfactory. Since it would be very difficult or impossible to free the human intestinal tract from the many varieties of food and bacterial protein which it commonly contains, vaccination as described above would be against many intestinal proteins besides the one specifically administered. Ingestion of bile would open the intestinal walls to

1. Editorial: Absorption of Protein, THE JOURNAL, 21:880, 1928.

2. Guyer, M. F., and Claus, P. E.: Effect of Foreign Protein and of Insulin Administered by Mouth After Ox Gall. Proc. Soc. Exper. Biol. and Med., 26:65, 1928.

any protein which chanced to be present, and such a general admission of proteins might eventually prove wholly undesirable. It is worthy of note, if confirmed, that insulin may under any conditions penetrate the intestinal walls.

Book Reviews

Diseases of Infants and Children. By Henry Dwight Chapin, A.M., M D., Emeritus Professor of Medicine (Diseases of Children) at the New York Post-Graduate Medical School and Hospital, and Lawrence Thomas Royster, M.D., Professor of Pediatrics and Head of the Pediatric Department of the University of Virginia. Sixth Revised Edition, 675 pages, illustrated. New York: William Wood & Co., 1928. Cloth, $7.50.

The original intent of the book has been carried out, namely, to present the subject in as compact a form as may be compatible with thoroughness. It is suitable for the general practitioner who has limited time for reading and wishes facts as briefly as possible.

It does not employ the detail of presentation of some of the more elaborate works upon the subject, but is an excellent text book.

Laboratory Diagnosis and Experimental Methods in Tuberculosis. By Henry Stuart Willis, the Johns Hopkins University and Hospital, with a Chapter on Tuberculo Complement-Fixation by J. Stanley Woolley, Loomis Sanatorium, New York. Introduction by Allen K. Krause, Johns Hopkins Hospital. 330 pages with 25 practical illustrations and 243 references, indexed. Springfield, Ill., and Baltimore, Md.: Charles C. Thomas, 1928. Cloth, $3.50; keratol, $4.25.

Starting with a description of the secretions and excretions and constituents of the body in tuberculosis, the methods of their collection for examination and bacteriological study are carefully given. Chapter 2, devoted to the methods of staining tubercle bacilli, is a complete discourse on this subject. The chapter on methods of concentration and isolation is one of practical importance, as is the author's description of methods of animal inoculation. The chapter assigned to the sources of the tubercle bacillus is worthy of special mention. The methods of cultivation of this organism are complete and the chapter on the non-pathogenic acid-fast bacteria is of value.

Tuberculin, its preparation and uses in diagnosis, are described. The serological diagnosis of tuberculosis is well presented.

Four chapters are devoted to the question of animal inoculation and experimental tuberculosis in animals.

The chapter on the equipment of a tuberculosis laboratory is a real asset. Only that which is essential is included in the description. As Dr. Allen Krause says in his introduction to this book, the medical profession is indebted to the author for bringing into one volume all the more important facts and methods of this phase of a still too prevalent disease.

Serum Diagnosis by Complement-Fixation. By John A. Kolmer, M.S., M.D., Dr.P.H., D.Sc., LL.D., Professor of Pathology and Bacteriology in the Graduate School of Medicine of the University of Pennsylvania and Member of the Research Institute of Cutaneous Medicine. 583 pages with 65 engravings. Philadelphia: Lea & Febiger, 1928. Cloth, $7.00.

Experience has taught the medical profession to look forward to all contributions of this author with pleasure, and the present volume is up to expectations.

Part 1 is devoted to "Principles of Serum and Complement-Fixation." The subject is well covered.

Part 2, "Principles of Complement-Fixation Technique," is a model of completeness and clarity, considering the technical character of the matter.

Part 3, "Technique of Complement-Fixation," is given in full detail and its application would result in better work from many laboratories. The Kolmer modification is described in full. The author adds the application of complement-fixation in identification of serum, blood and seminal fluid as well as the detection of the adulteration of milk and meat.

Part 4 deals with "Clinical Application of the Complement-Fixation Test." This section shows wide experience, work of long duration and careful evaluation of data.

Following each chapter there is a selected biography.

Despite the technical character of the book, the subject is very clearly presented.

Bacteriology, General Pathological and Intestinal. By Arthur Isaac Kendall, B.S., Ph.D., Dr.P.H., Professor of Research Bacteriology in the Northwestern University Medical School, Chicago, Illinois. Third Edition, Thoroughly Revised. 733 pages, illustrated with 103 engravings and 8 plates. Philadelphia: Lea & Febiger, 1928. Cloth, $7.00.

This volume, dedicated to Theobald Smith by one of America's most distinguished bacteriologists, attempts no new classifications of bacteria. Dr. Kendall does not call the diphtheria bacillus a corynebacterium, nor the tubercle bacillus a mycobacterium, but accepts, to avoid confusion, the older terminology.

His order of discussion of his subject is first, the general attributes of bacteria: their morphology, physiology, chemistry, metabolism, and mode of life. Following this he discusses fully immunity and the immune reactions. He considers the outstanding recent event in the diagnostic field to be the development of the Kahn test, and the section on this subject has been written by Dr. Kahn himself.

Microscopic and cultural methods of examination of bacteria follow the description of serum reactions. The pathogenic bacteria are described in about 300 pages; then the higher bacteria, molds, yeasts, filterable viruses and diseases of unknown etiology. There is a chapter on gastro-intestinal tract bacteriology; and the final section deals briefly with bacteria in milk, soil and air. There is no mention of Noguchi's recent work on the etiology of trachoma, which is no doubt too new for inclusion in a text-book of this year.

The illustrations are for the most part small, not in colors, and not particularly clear. As a text-book of bacteriology and immunology, this is a very valuable work.

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Southern Medical News

ALABAMA

Dr. Douglas L. Cannon, Montgomery, has been appointed Acting State Health Officer with full authority until further notice. Dr. Cannon was Assistant to the late Dr. Samuel W. Welch, who had been State Health Officer of Alabama for some years.

Dr. William Sessions Hannah, Montgomery, and Miss Rebecca Jane Dennis, of Crisfield, Md., were married June 30.

Deaths

Dr. Clifford O. B. Alford, Bessemer, aged 31, died March 5 of acute myocarditis and acute gastritis.

Dr. William G. Aikin, Stockton, aged 71, died June 25.

Dr. Jeptha Newton Scott, Montgomery, aged 75, died August 10 of senility and heart disease.

Dr. Clement Eugene Pugh, Grove Hill, aged 62, died June 12 of chronic nephritis.

ARKANSAS

The meeting of the Tri-State Medical Society (Louisiana, Arkansas and Texas) will be held at Texarkana January 17-18, 1929.

Dr. J. T. Palmer, Pine Bluff, was recently appointed Physician of the Arkansas Boys' Industrial School at Pine Bluff.

Deaths

Dr. Ellen Hedrick, Mansfield, aged 54, died March 22 at a hospital in St. Louis of pneumonia.

Dr. C. A. Rice, Rogers, aged 63, died October 7 of heart disease.

DISTRICT OF COLUMBIA

Dr. Leland O. Howard, formerly Chief of the Bureau of Entomology, U. S. Department of Agriculture, has been made an officer of the Legion of Honor by the Government of France.

Deaths

Dr. Charles G. MacCallion, Washington, aged 75, died July 26 at Pottersville, Mass., of mitral insufficiency.

Dr. Winfield Scott Montgomery, Washington, aged 74, died September 11 of arteriosclerosis and acute dilatation of the heart.

FLORIDA

Washington-Holmes County Medical Society was organized October 3. The following officers were elected: Dr. W. E. Coleman, Chipley, President; Dr. W. C. Harper, Chipley, Secretary; Dr. H. A. McClure, Chipley, Treasurer.

Dr. Whitman C. McConnell is the new Superintendent of the Faith Hospital, St. Petersburg.

Caroline M. Borcherding has resigned her position as Superintendent of the Alachua County Hospital, Gainesville.

Deaths

Dr. Charles Andrew Lattin, Hastings, aged 84, died in July.

GEORGIA

Dr. R. F. Wheat, Bainbridge, and Dr. T. J. McArthur, Cordele, have been appointed members of the Georgia State Board of Medical Examiners.

Dr. Samuel R. Methvin, Lindale, has been appointed Physician for the Lindale Mills, succeeding Dr. J. N. Cheney, resigned.

Deaths

Dr. Frederick W. Tyler, Norman Park, aged 72, died July 28 of senility.

Dr. Daniel Christopher Montgomery, Thomasville, aged 70, died suddenly September 11.

KENTUCKY

At the recent annual meeting of the Kentucky State Medical Association held in Richmond, Dr. Granville S. Hanes, Louisville, was elected President-Elect; Drs. Jarvis L. Anderson, Manchester, Edward Wilson, Pineville, and Austin F. Finley, Madisonville, Vice-Presidents; Dr. William B. McClure, Lexington, Treasurer; Dr. Arthur T. McCormack, Secretary, re-elected for a term of five years.

Woodford County Medical Society was reorganized August 13. Dr. W. E. Risque, Midway, was elected President; Dr. S. A. Blackburn, Secretary.

Deaths

Dr. John Henry Tyler, Winchester, aged 54, died August 8 at Louisville of interstitial nephritis.

Dr. Wilbur F. Stirman, Owensboro, aged 72, died August 24 of cirrhosis of the liver.

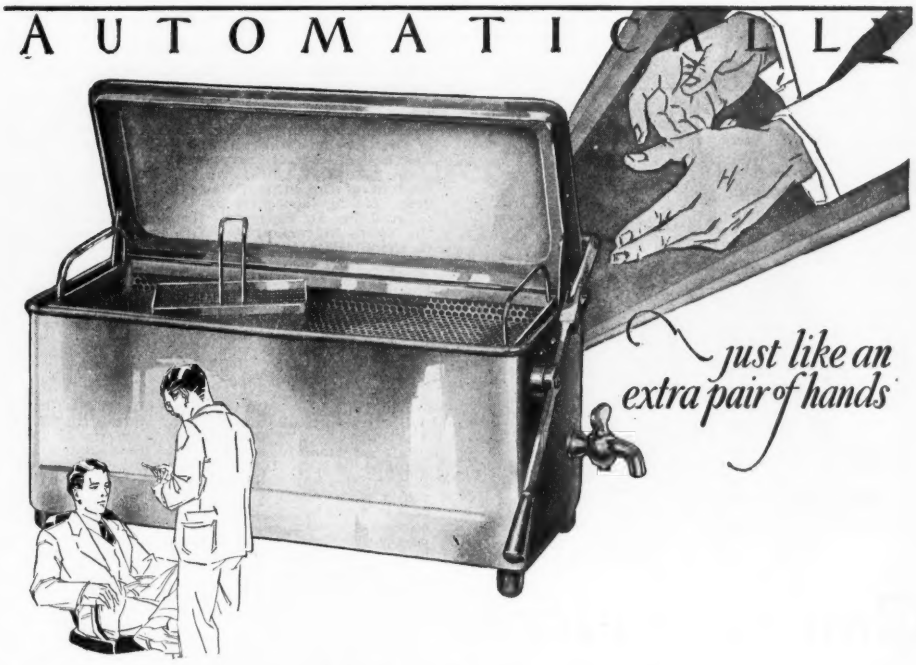
Dr. Samuel Manly, Louisville, aged 84, died August 19 of heart disease and nephritis.

Dr. Bernard James O'Connor, Louisville, aged 48, was found dead in his office September 1 of heart disease.

Dr. John Garland Hendrick, Central City, aged 85, died September 23 of senility.

Dr. Richard Walter Long, Madisonville, aged 51, died September 11 of heart disease and diabetes mellitus.

(Continued on page 34)



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(Continued from page 1086)

LOUISIANA

The Seventh District Medical Society held its Fall Meeting in Opelousas September 13.

The Tri-State Medical Association (Louisiana, Arkansas and Texas) will publish the Tri-State Medical Journal, a monthly publication. The Managing Editor is Dr. Guy A. Caldwell and the Associate Editor Dr. Peachey Gilmer, Shreveport.

Dr. G. M. G. Stafford has resigned as Superintendent of the State Colony Training School, Alexandria. He is succeeded by Dr. R. C. Tompkins.

Dr. John D. Spelman, formerly Superintendent of the Touro Infirmary, New Orleans, has been appointed to the Superintendency of Montefiore Hospital, Pittsburg, Pa.

Surgeon Thomas B. H. Anderson, U. S. Public Health Service, for three and a half years executive officer of the Marine Hospital at New Orleans, has been ordered to Pittsburgh to take charge of the U. S. Marine Hospital there.

MARYLAND

The Baltimore Municipal Architectural Commission will carry out the original plan for the City Hospitals. The expansion of the Sydenham group of City Hospitals on Harford Road will be carried out about as planned by Dr. C. Hampson Jones, Commissioner of Health; the new buildings at the Baltimore City Hospitals with Ward A as a base will include a psychopathic hospital, a tuberculosis hospital, an administration building and a nurses' home. Some of the present buildings will remain. The frame buildings and the psychopathic units will be torn down.

Dr. Christopher Johnston, formerly Assistant Resident Physician at the Johns Hopkins Hospital, has accepted a position as Assistant Resident Physician at the Rockefeller Institute.

Dr. Harry J. Deuel, Jr., Ph.D., Assistant Professor of Physiology, Cornell University Medical College, New York, has been appointed head of the Department

(Continued on page 36)

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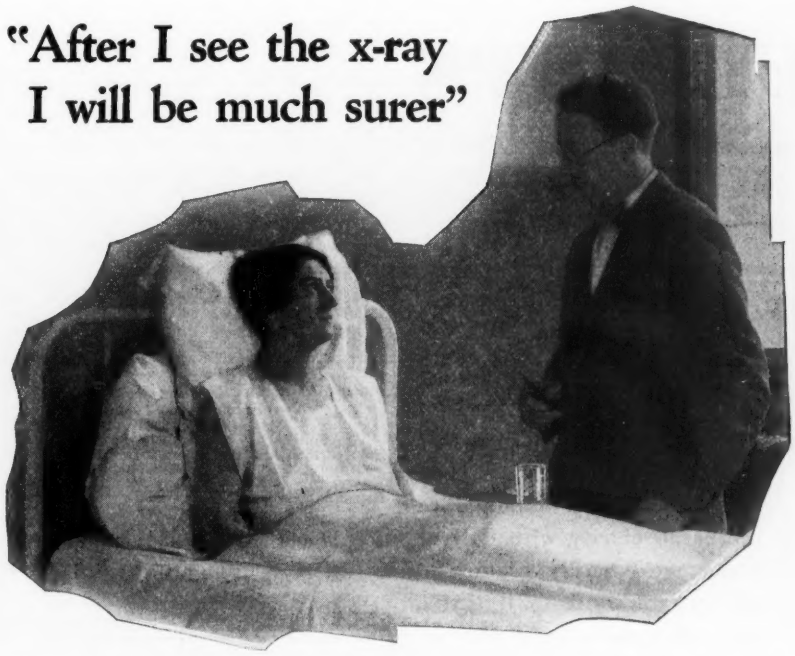

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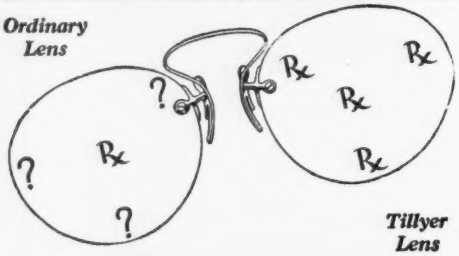

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(Continued from page 34)

of Physiology at the University of Maryland School of Medicine.

Dr. Frederick I. Wertheimer, Associate in Psychiatry, Henry Phipps Psychiatric Clinic, Johns Hopkins Hospital, Baltimore, has announced that he has changed his name to Dr. Wertham.

Dr. Clarence E. Ferree, Ph.D., and his wife, Gertrude Rand, Ph.D., from Bryn Mawr College, have taken up their new work in the Research Department of the Wilmer Eye Institute. Dr. Ferree will be Director of the Laboratory of Physiologic Optics. Dr. Rand will be Associate Professor of Research Ophthalmology.

Dr. Walter K. Slack is Assistant Resident Physician at the Presbyterian Eye, Ear and Throat Charity Hospital, Baltimore.

Dorothy Mathews has been appointed to fill the vacancy left by Florence Waters, who resigned her position as Superintendent of the Easton Emergency Hospital, Easton.

Deaths

Dr. John Clinton Stansbury, aged 39, died August 30 of diabetes mellitus.

Dr. James Henry Preston, Hampstead, aged 78, died August 23 of myocarditis.

Dr. Maurice Lazenby, Baltimore, aged 51, died September 18 of heart disease.

MISSISSIPPI

The Southern Tuberculosis Conference and Southern Sanatorium Association met in Biloxi September 12-15.

Grace Klein has been appointed to succeed Etta Easterling as Superintendent of the Granada Hospital, Granada.

Deaths

Dr. Lewis S. Greene, New Site, aged 51, died June 17.

Dr. Jesse E. Seale, Meridian, aged 61, died September 9 of cerebral hemorrhage.

(Continued on page 38)

For accurate digitalis dosage by mouth

DIGITAN TABLETS

CONVENIENT

DEPENDABLE

STANDARDIZED

Sample sent upon request

MERCK & CO. INC.

Main Office: Rahway, N. J.

KNOX SPARKLING GELATINE holds an important position in the diabetic diet

In the treatment of diabetic patients, plain gelatine, free from sugar, has great value, both as a carrier of more concentrated foods, and as an aid to the absorption of these foods by the body. Experiments have demonstrated that the administration of gelatine to the diabetic often reduces the waste of body protein by as much as 63.7 per cent.

Knox Sparkling Gelatine helps overcome the everlasting monotony of the usual diabetic diet. Because it is a pure protein, of known caloric value, food formulas can be calculated easily, and a number of tempting dishes can be introduced into the menu. The added bulk helps impart that feeling of satiety which the patient craves.

In the feeding of infants, the protective colloidal ability of Knox Sparkling Gelatine is well known. It largely prevents the formation of hard curds and so helps overcome colic, regurgitation and other complaints arising from imperfect milk digestion. It is invaluable in the diets of invalids and convalescents, where appetites must be coaxed in every way possible.

For 40 years we have devoted all our attention to the manufacture of Knox Sparkling Gelatine. From raw material to finished package, every process is under constant chemical and scientific control. The product is a pure gelatine; unbleached, without flavoring, without coloring and free from sugar.

CAUTION!

All gelatines are not alike. Many have added acid, flavoring and coloring matter. In the form of ready prepared desserts, they contain as high as 85 per cent carbohydrates.

Knox Sparkling Gelatine is a protein in its purest form, particularly suitable where carbohydrates and acids must be avoided. It contains more than 80 per cent pure protein (4 calories per gram), and has the same neutrality as milk.

When you specify Knox you prescribe gelatine that will protect the patient from brands unsuitable for his dietary purposes.

Leading Dietitians Have Prepared These Booklets

They contain a wealth of information on the value of Knox Sparkling Gelatine, with suggestions for many appetizing dishes that will help vary the prescribed diets. These, together with data on many scientific tests, are available to surgeons, doctors, dietitians, and nurses. Check those you wish and mail us the coupon.

KNOX GELATINE LABORATORIES,
416 Knox Avenue, Johnstown, N. Y.

Please send me, without obligation, or expense, the booklets which I have marked. Also register my name for future reports on clinical gelatine tests as they are issued.

( ) Varying the Monotony of Liquid and Soft Diets

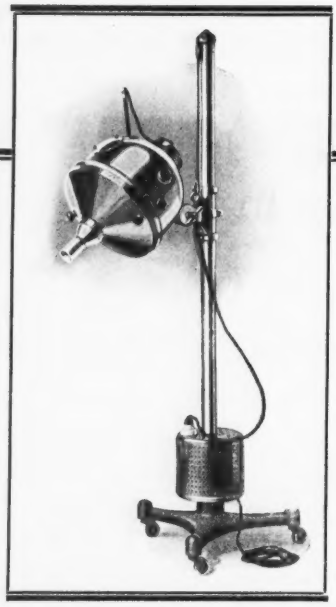
( ) Diet in the Treatment of Diabetes

( ) The Value of Gelatine in Infant and Child Feeding

( ) General Recipe books for the home. "Dainty Desserts, Salads, Candies" and "Food Economy".

Name..... Address.....

City..... State.....



A New Britesun Achievement

The Single Arc Automatic Lamp

Prompted by a desire to maintain its leadership in the field of carbon arc production and to offer customers the best and most complete line of professional therapeutic lamps, Britesun, Inc., is pleased to announce a handsome new carbon arc modality, the new BRITESUN SINGLE ARC AUTOMATIC LAMP. This is a lamp noteworthy for its efficiency, dependability, ease of operation, economy and wide therapeutic range.

The arc is struck automatically as soon as the current is switched on and no attention is necessary while the lamp is burning. By using various types of Eveready (National) Sunshine and Therapeutic carbons in the new Britesun Single Arc Automatic lamp a complete balanced spectrum or any desired range of the spectrum can be produced. Twelve inch, 10 millimeter carbons are used which minimizes loss of time and gives a maximum continuous burning period of three and one-half hours.

Price Complete, $135.00

Further particulars regarding this convenient and efficient lamp will be gladly furnished on request without obligation.

BRITESUN, INC.

ULTRA VIOLET–RADIANT THERAPY–INFRA RED

3735-39 Belmont Avenue, Chicago
Authorized Distributors in All Leading Cities

(Continued from page 36)

MISSOURI

A $50,000 trust fund to be divided between St. Louis Children's Hospital and Washington University was provided in a codicil to the will of Joseph D. Bascom, St. Louis rope manufacturer who died August 5. His son, Charles E. Bascom, was named trustee with authority to distribute the trust "in the manner and proportion which, in his judgment at the time of the distribution, will most faithfully represent the institutions' respective usefulness to this community and at the same time their respective financial needs."

Dr. E. Lee Myers, St. Louis, has returned from his visit to the clinics of Europe and attending the Congress of Oto-Rhino-Laryngology.

Dr. John S. Knight, Kansas City, Assistant Superin-

(Continued on page 40)

CLASSIFIED ADVERTISEMENTS

LABORATORY TECHNICIAN—Young lady trained in routine laboratory procedures and also occupational therapy desires position with doctor or in small hospital. Miss Ella Ford, Elrod, Alabama.

DOCTOR'S ASSISTANT—age 28, experienced in routine laboratory work, also moderate typing, desires position with physician. Mrs. Mary Smith, 1512 11th Avenue, South, Birmingham, Alabama.

WANTED—RESIDENT PHYSICIAN, private hospital nervous and mental diseases; single man preferred; graduate class A school; knowledge of psychiatry not essential; give complete information and references first letter. S. C., care Southern Medical Journal.

COMPLETE set of instruments for eye, ear, nose and throat specialist. A six-drawer Treatment Table, Springfield three-piece Gas Sterilizer, Treatment Chair, Instrument Cabinet, Perimeter, Trial Case, Ophthalmometer on adjustable table, Suction and Pressure Apparatus. Will sacrifice. Address Mrs. Inez B. Martin, 721 East 41st Street, Savannah, Georgia.

LITERARY ASSISTANCE on special medical subjects for busy physicians. We promptly develop any subject of popular or technical interest from the latest authorities, using the unlimited facilities available here. Reasonable rates; correspondence confidential. We also edit, revise and enlarge physicians' manuscripts. Authors' Research Bureau, 500 Fifth Avenue, New York, N. Y.

DRUG AND ALCOHOLIC PATIENTS are humanely and successfully treated in Glenwood Park Sanitarium, Greensboro, N. C.; reprints of articles mailed upon request. Address W. C. Ashworth, M.D., Owner, Greensboro, N. C.

TO THE MEDICAL PROFESSION: We are filling a long-felt want by conducting a training class teaching blood counts, urinalyses, sputum and feces examinations; also basal metabolism readings. We will gladly furnish you with competent office assistants trained in such laboratory procedures as you may require. Our classes are made up of stenographers, bookkeepers, registered nurses and clerks. Send us your office assistant for training. Write or telephone for full information. Dial 3-3598. John V. Mix, Director, Alabama Pathological Laboratory, 1005 Martin Building, Birmingham, Alabama.

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INTERNATIONAL EQUIPMENT COMPANY
352 Western Ave., Boston, Mass.

The Cod Fish Region

DOTTED along the shore line from Cape Cod up to Labrador are the Patch plants, where the fishermen bring in their daily catch of cod fish, and the oil is obtained by promptly cooking the fresh livers.

Because of the far-flung range of these plants and the steam trawlers following the fish into deep water, Patch's Flavored Cod Liver Oil is made when and where the fishing season is right.

Your assurance of therapeutic potency is the vitamin guarantee for both A and D which appears on each bottle of Patch's Flavored Cod Liver Oil. Each lot is biologically tested, to insure your patients a dependable product.

There is a distinctive flavor to

Patch's Flavored Cod Liver Oil

and the proof of the flavor is in the tasting, so we want you to taste it. Let us send you a bottle, just to give you an agreeable surprise.

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Boston, Mass.

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MANHATTAN EYE SALVE COMPANY

Louisville, Kentucky

(Continued from page 38)

tendent of the Kansas City General Hospital, has resigned.

Dr. Hardy A. Kemp has resigned from the staff of the Missouri State Sanatorium for the Treatment of Incipient Tuberculosis, Mount Vernon. He will become Associate Professor of Bacteriology at Baylor University College of Medicine, Dallas, Texas.

Dr. Frank B. Fuson, Jefferson City, has resigned as Health Supervisor for the State Eleemosynary Institutions to become Superintendent of the Evergreen Place Hospital and Sanatorium, Leavenworth, Kan.

Deaths

Dr. Kossuth L. Morgner, St. Louis, aged 79, died July 30 of uremia.

Dr. Nicholas John Pippert, St. Louis, aged 47, died August 17 of shock and skull fracture.

Dr. Park Lewis McDonald, Kansas City, aged 66, died June 8.

Dr. Greenfield Sluder, St. Louis, aged 62, died October 9 following amputation of his right leg after a long illness.

Dr. Henry William Hermann, St. Louis, aged 72, died August 18 of lobar pneumonia and cerebral hemorrhage.

Dr. William Charles West, Kansas City, aged 48, died August 16 of cerebral hemorrhage.

Dr. Walter Jackson Lowrey, Kansas City, aged 67, died September 3 of pulmonary tuberculosis.

Dr. Alex T. McMurtry, Salem, aged 73, died July 27 of heart disease.

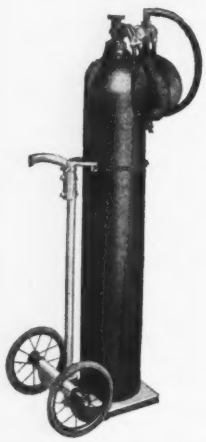
NORTH CAROLINA

The Seventh District Medical Society met at Lincolnton October 8. The following officers were elected: Dr. J. R. Gamble, Lincolnton, President; Dr. John Hill Tucker, Charlotte, Vice-President; Dr. Raymond Thompson, Charlotte, Secretary, re-elected.

The Ninth District Medical Society met at Statesville September 27. The following officers were elected: Dr. Roy Tatum, Statesville, President; Dr. Glenn

(Continued on page 42)

OXYGEN THERAPY



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It is also equipped for treatment of patients who have been overcome with automobile fumes, illuminating gas and other vapors.

The little outfit embodies the Automatic Valve controlled by the breathing of the patient, so that the treatment may be carried out by the patient in the home or by the attendants in the hospital.

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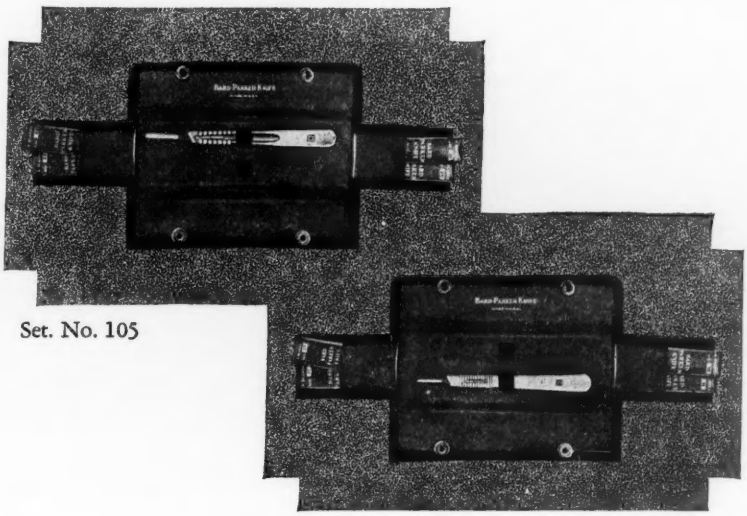
It's Sharp



Set. No. 105

Set. No. 104

IN your office, at the hospital, on emergency calls, you will never be without a sharp knife if you carry a Bard-Parker Knife Set.

One handle and twenty-four new blades contained in a handsome, pocket size leather case, makes the Bard-Parker Knife Set a valuable addition to your equipment.

Prices — Set No. 103 (minor and major) One Nos. 3 and 4 handles and six each of Nos. 10, 11, 12, 15, 20, 21, 22 and 23 blades in leather case — $9.75.

Set. No. 104 (minor) One No. 3 handle and six each of Nos. 10, 11, 12 and 15 blades in leather case—$5.75.

Set No. 105 (major) One No. 4 handle and six each of Nos. 20, 21, 22 and 23 blades in leather case—$5.75.

Name or initials stamped upon case in gold—50 cents.

Order the Sets by number from your Bard-Parker Agent.

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369 Lexington Avenue, New York, N.Y.

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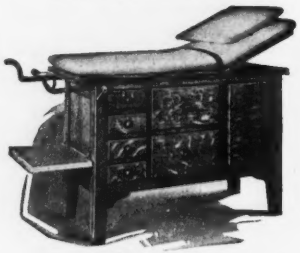
Mahogany or Quartered Oak
Tables, Cabinets, Stands, Chairs
Stools, Accessories



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(Continued from page 40)

Frye, Hickory, Vice-President; Dr. James W. Davis, Statesville, Secretary-Treasurer.

The Davis Hospital, Statesville, has enlarged its Eye, Ear, Nose and Throat Department.

Dr. H. Q. Alexander, Matthews, has been nominated for the Vice-Presidency of the United States by the Farmer-Labor party.

Dr. Robley R. Goad is connected with the Davis Clinic, Statesville.

Dr. Frank Baker Marsh, Salisbury, and Miss Martha Louise Jenkins, Tarboro, were married September 8.

Dr. William Henry Powell, Jr., Fayetteville, and Miss Harriet Stanton, Wilmington, were married at Richmond, Va., October 3.

Dr. Howard Leon Sumner and Miss Mary Adams Ward, both of Asheville, were married September 15.

Deaths

Dr. Walter Talmage Long, Roxboro, aged 46, died October 3.

Dr. Joseph Henderson Caldwell, Charlotte, aged 38, died August 17 of uremia.

Dr. Edmund T. White, Oxford, aged 70, died July 31 of myocarditis.

Dr. Samuel Ellington, Winston-Salem, aged 76, died August 3 of arteriosclerosis and cerebral hemorrhage.

Dr. David Nicholas Dalton, Winston-Salem, aged 70, died September 4 of cerebral hemorrhage.

Dr. Edward Jenner Wood, Wilmington, died suddenly at his home September 16.

Dr. William Elmore Wilson, Mooresville, aged 64, died September 6 of chronic catarrhal colitis.

OKLAHOMA

The State Health Department recently announced that 300,000 capsules of quinin have been distributed in Bryan, Choctaw and Pushmataha Counties as a part of the campaign to eradicate widespread malaria infection.

(Continued on page 44)

IN THE TREATMENT OF

CYSTITIS and URETHRITIS
OLEO-GOMENOL

has therapeutic properties to an exceptional degree

A most powerful germicide. *An effective deodorant.* *A dependable analgetic.*

Unlike the Eucalyptols it is free of any trace of aldehydes.

For more than twenty-five years Oleo-Gomenol has been continuously and effectively used in the clinics of Europe, and in the offices of several hundred American urological specialists.

Packed in containers of 48 cc., 100 cc., 250 cc., and 1000 cc.

"GOMENOL—(Gomen, *a locality in New Caledonia,* + L. oleum, *oil.*) *An ethereal oil obtained from a plant,* Melaleuca viridiflora; *it is said to have powerful germicidal action and to be free from irritating properties when locally applied.*"—STEDMAN'S MEDICAL DICTIONARY.

OLEO-GOMENOL—*Gomenol with chemically pure, alcohol-washed Olive Oil in the following percentages 5%, 10%, 20%, and 33%.*

Circular on request.

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79 Madison Avenue **Exclusive Agent for the United States** New York, N. Y.

Prestige
is far more than assertion

Prescribers of DIGALEN constitute a roll call of many distinguished cardiologists.

DIGALEN is not a tincture or simply an ordinary extract of digitalis. There is no other preparation just like it. DIGALEN contains only the beneficial cardio-active glucosides of digitalis, isolated and so determined by the noted pharmacologist Cloetta, and none of the other elements in digitalis which, while also toxic, are nevertheless devoid of any therapeutic benefit.

It was the immortal Withering who urged that the dosage of digitalis be brought to a "finer degree of accuracy." For over a quarter of a century Roche chemists, with every scientific resource at hand, have striven toward that salutary end and with success. The prestige of Roche is founded to a great extent on the unquestionable value of DIGALEN.

When a physician prescribes DIGALEN, be it by injection, in emergency, or by mouth for a chronic cardiac condition, he can do so content in the knowledge that it will give prompt action wherever the heart can respond to digitalis. . . .

COUNCIL ACCEPTED

DOSAGE

Orally: 8 to 32 minims 3 times daily until compensation is re-established. Reduce dosage gradually.

By injection: in critical cases, inject 2 to 4 cc. preferably into the vein, following with 2 cc. deep into the muscle every 2 hours.

Digalen is put up in vials, ampuls, oral tablets and hypodermic tablets. . . .

A trial for your bag will be sent on request

The Hoffmann-La Roche Chemical Works, New York
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Trade-Mark Registered **STORM** Trade-Mark Registered

Binder and Abdominal Supporter

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KATHERINE L. STORM, M.D.

Originator, Patentee, Owner and Maker

1701 DIAMOND ST. PHILADELPHIA

(Continued from page 42)

Deaths

Dr. William Clark Griffith, Weleetka, aged 66, died August 16 at Terrell, Tex., of cirrhosis of the liver and dilatation of the heart.

Dr. Peter H. Stultz, Supply, aged 57, died August 23 at Halstead, Kan., of heart disease.

Dr. Mary Torrey Roudebush, Norman, aged 35, died September 14 of heart disease and asthma.

SOUTH CAROLINA

Dr. Larkin H. Jennings, formerly of Bishopsville, has been appointed Director of the new full-time County Health Unit for Oconee County. This County is engaged in raising funds for the construction of the County Hospital.

Dr. Russell Fletcher Wilson, Spartanburg, and Miss Aloe Everton, Jacksonville, Ga., were married in Augusta recently.

Deaths

Dr. Herman Decatur Beckman, Georgetown, aged 51, died August 25 of chronic myocarditis and interstitial nephritis.

Dr. Walter Hollis Everhart, Columbia, aged 50, died August 12 of Angina pectoris.

Dr. William Boyd Brigman, Bishopville, died September 20 in the U. S. Veterans' Hospital at Lake City, Fla.

TENNESSEE

The Walnut Log Medical Society held its annual session September 19. The following officers were elected: Dr. J. M. Peebles, Clinton, Ky., President; Dr. J. D. Brewer, Dyersburg, Vice-President; Dr. Ira Parks, Union City, Secretary.

Knox County Medical Society held an all-day clinical session at Whittle Springs September 25.

The State Department of Health has established a branch laboratory at Johnson City; there are branch

(Continued on page 46)

Mulford Diphtheria Products

SUPER-CONCENTRATED DIPHTHERIA ANTITOXIN is a highly refined serum of low protein content. It minimizes serum sickness and is rapidly absorbed. Less bulk—Less pain — Quicker results.

DIPHTHERIA TOXIN-ANTITOXIN MIXTURE develops an immunity in about eight weeks which continues effective for some years, probably for life.

DIPHTHERIA TOXOID, for active immunization against diphtheria, is chemically-altered toxin.

It is non-toxic and therefore harmless.
The immunity develops more rapidly.
It is more stable.
It does not produce sensitiveness to horse serum.
Practically no reactions occur in children of six years, or under.

H. K. MULFORD CO., Philadelphia, U. S. A.

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For Complemental Feeding

Prescribe DRYCO The Safe Milk

MANY pediatrists advocate regular complemental feedings for the breast fed infant. They find that this relieves the strain upon the mother, prolongs the nursing period and has an excellent effect upon the weight and general nutritional condition of the child. Such a procedure also minimizes the difficulties attendant upon eventual weaning. . . . . .

Dryco is ideal for use in conjunction with breast milk. The special drying process renders the formation of thick, tenacious curds impossible, eliminating digestive and nutritional disturbances. Free from pathogenic bacteria, the use of Dryco avoids milk-borne infections.

LET US SEND SAMPLES, SUGGESTED FEEDING TABLES AND CLINICAL DATA

For convenience, pin this to your Rx blank or letterhead and mail.

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Constipation

IN THE BREAST-FED INFANT

Horlick's Malted Milk has long been used with success in the prevention and correction of constipation among breast-fed infants.

For the Nursing Mother:

Many doctors advise the nursing mother to drink regularly each day three glasses of Horlick's—the Original—Malted Milk, knowing that she will add to her own store of energy, increase the flow of her breast milk and provide her child with the food elements which result in regular bowel movements daily.

For the Breast-fed Baby:

Supplementary feedings of "Horlick's" almost invariably bring relief to the child and rest to the mother, even in stubborn cases of constipation.

Clip out this coupon and return for a supply of samples:

Name..... M. D.

Address.....

Horlick Racine, Wisconsin

(Continued from page 44)

laboratories also at Memphis, Chattanooga and Knoxville.

Dr. A. F. Richards has been elected head of the new Knox County Health Unit.

Drs. Robert Baker, R. B. Wood and Richard McIlwaine have been elected School Physicians for Knoxville.

Dr. Leander Campbell Bryan, Rutledge, and Miss Mary Johnson, Decatur, were married September 26.

Dr. George W. Dahnke and Miss Olive Elizabeth Threlkeld, both of Memphis, were married September 3.

Dr. H. J. Hayes, Memphis, and Miss Catherine Luckey, Balboa Heights, Canal Zone, Panama, were married September 10.

Dr. J. Sumpter Anderson, Nashville, and Miss Grace Marian Smith were married September 25.

Dr. Travis Henry Martin and Miss Corinne Hayes Tanksley, Nashville, were married October 2.

Deaths

Dr. Robert Fagin, Memphis, aged 46, died August 8 following a long illness.

Dr. J. L. Outlaw, Medon, aged 69, died suddenly August 31.

Dr. Olin Weakley, Nashville, aged 85, died July 13 at St. Thomas Hospital of uremia following hypertrophy of the prostate.

Dr. David D. Britton, Church Hill, aged 79, died August 23 of pneumonia.

Dr. Andrew Guthrie Hicks, Memphis, aged 85, died August 22 in a hospital at Jackson of a fracture of the hip, following a fall.

Dr. Thomas Braxton Burdine, Lawrenceburg, aged 64, died August 4.

Dr. W. H. Tanksley, Nashville, aged 52, died October 2.

TEXAS

The Southwest Texas District Medical Society held its twentieth semi-annual meeting July 24-25. The

(Continued on page 48)

Where alkaline treatment is indicated

KALAK WATER

makes possible the administration of alkalies in large amounts and in agreeable fashion.

More logical than the single alkali (like sodium bicarbonate) Kalak Water contains several elements needed for maintaining the normal alkali reserve of the body.

Each bottle contains in sparkling form the bicarbonates of sodium, potassium, calcium and magnesium.

Kalak Water offers the strongest alkaline water of commerce.

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BREAST MILK

is Nature's Food for the Baby

MANUAL EXPRESSION

of the Breast Stimulates it to Greater Excretion

WHEN ALL EFFORTS

to supply the infant with Breast Milk fail

TRY COMPLEMENTING

those breast feedings which do not satisfy with

SIMILAC

A scientific milk modification, adapted to the nutritional requirements of infants deprived of breast milk.

SAMPLES AND LITERATURE
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DUODENAL TUBES

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Price $2.00

I. L. LYONS & CO., LIMITED

NEW ORLEANS, LA.

(Continued from page 46)

following officers were elected: Dr. L. J. Manhoff, San Antonio, President; Dr. J. J. Robertson, Kingsville, Vice-President; Dr. A. N. Champion, San Antonio, Secretary-Treasurer.

The newly organized Sweetwater Clinic is composed of Drs. C. A. Rosebrough, Amos Fortner, Robert R. Allen, Alfred A. Chapman and L. O. Dudgeon.

Brady Sanitarium is planning to double the present capacity of thirty beds. With the completion of the addition, the hospital will have 75 rooms, 60 of which will be available to patients.

The University of Texas School of Medicine, Galveston, has a new laboratory of tropical medicine and additions to the children's hospital. All medical school laboratories are being enlarged to meet the demands of an increased enrollment of students and the John Sealy Hospital is constructing a new power plant at a cost of $400,000. Among the additions to the faculty are Dr. Edward Randall, Jr., as Professor of Materia Medica and Therapeutics; John J. Sinclair, Professor of Histology and Embryology, and Dr. Paul Brindley, Acting Director of the Department of Pathology.

Changes in the faculty at Baylor University College of Medicine, Dallas, include Dr. Maurice L. Richardson, formerly of Western Reserve University School of Medicine, Cleveland, who becomes Professor of Pathology, and Dr. Harold E. Smith, Assistant Pathologist.

Dr. LeRoy B. Duggan, Belton, has been made Assistant Director of Health of the Dallas Public Schools, succeeding Dr. L. E. Hamilton, who resigned.

Dr. James Hooper Stiles, Lubbock, and Miss Marguerite Bennett were married September 29.

Deaths

Dr. William Keenon McCardell, Livingston, aged 70, died June 8.

Dr. William P. Sims, Boz, aged 64, died September 12 of heart disease.

(Continued on page 50)

"Physicians fighting to save twin's life"

This was the heading of a pathetic news item appearing in a recent issue of The Baltimore Sun. Two little boys had swallowed poison tablets taken from the family medicine cabinet. One is dead. The attending physicians saved the other only by heroic efforts.

Contrast this fatal tragedy with a harmless incident reported from Colorado the other day. A little boy swallowed practically the entire contents of a three ounce bottle of Hexylresorcinol Solution S. T. 37. The anxious mother was assured it could not harm the child.

The *safety* feature of Hexylresorcinol Solution S. T. 37 should appeal to every physician. While this solution destroys bacteria *instantly on contact*, it is absolutely SAFE. Accidental poisoning impossible.

Three and twelve ounce bottles.

Sharp & Dohme, Baltimore, Md.

Quality First Since 1860

New York Chicago New Orleans St. Louis Atlanta Philadelphia
Kansas City San Francisco Boston Dallas

Patient Types . . .

The Obstinate Case

The patient with an obstinate case of constipation is generally addicted to self-medication and "tries everything." Each bowel-whipping cathartic simply drives the tired bowel from bad to worse.

The doctor knows it is possible to restore the normal daily "habit time" of bowel movement by appropriate diet, exercise and the mechanical aid afforded by Petrolagar.

Petrolagar is more palatable, more thoroughly softens the feces, is less likely to leak and, having no deleterious effect on digestion, is prescribed in preference to plain mineral oil.

Petrolagar

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Chicago Dept. S.O.12

Gentlemen: — Send me copy of the new brochure "HABIT TIME" (of bowel movement) and specimens of Petrolagar.

Dr.....

Address.....

.....

(Continued from page 48)

Dr. Bernard J. Fehrenkamp, Frelsburg, aged 73, died April 27.

Dr. Thomas S. Slater, Corsicana, aged 60, died July 1 of nephritis.

Dr. Selby H. Evans, Anna, aged 66, died September 12 of cerebral hemorrhage.

Dr. Milton J. Bliem, San Antonio, aged 67, died suddenly September 8 at the home of his sister in Allentown of angina pectoris.

Dr. Otto K. Peters, Galveston, aged 56, died May 6 of heart disease.

VIRGINIA

The following are among the twenty-two additions to the faculty of the University of Virginia, Charlottesville: Dr. Edwin P. Lehman, formerly Associate Professor of Clinical Surgery, Washington University Medical School, St. Louis, to be Professor of Surgery and Gynecology, succeeding Dr. Stephen H. Watts, resigned: Dr. Sydney W. Britton, formerly of Johns Hopkins University School of Medicine, Baltimore, Md., to be Professor of Physiology, succeeding Homer W. Smith, Sc.D., who goes to the Physiologic

(Continued on page 54)

MERRELL-SOULE Products
Keep Indefinitely . . . .

SPECIALLY packed by a process which assures the quality of keeping *indefinitely,* Merrell-Soule Powdered Protein Milk, Powdered Whole Lactic Acid Milk, and Klim are at all times obtainable fresh, pure, and ready to use.

This Merrell-Soule group comprises fundamental bases and accepted adaptations—not complete formulae, combinations or "baby foods". Each product fits into the modern and scientific system of infant feeding by which formulae are created by the *physician*—not by the manufacturer.

The Merrell-Soule system of dehydration preserves the nutritive values of the original, expertly made fluid equivalents. Scientific control assures unmatched uniformity and bacteriological purity. Greater digestibility is imparted by the breaking up of fat globules and casein. All claims for Merrell-Soule Milk Products are supported by clinical tests.

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CHICAGO

(Continued from page 50)

Department of New York University; Dr. Thelma F. Brumfield, promoted from Instructor to Assistant Professor of Bacteriology and Pathology; Claude M. MacFall, formerly of the University of California, to be Assistant Professor of Biology.

Dr. E. N. Lillard, Graves Mill, has located at Nokesville, where he has taken over the practice of the late Dr. A. R. Gray.

Dr. J. D. Hagood, Clover, has been elected Vice-Chairman of the Halifax County School Board.

Dr. John Melvin Crymes, South Hill, and Miss Ruth Elizabeth Staude, Richmond, were married recently.

Deaths

Dr. George Jarvis Bownes, Norfolk, aged 59, died June 6 at New York.

Dr. Leo Powers Burke, Hilton Village, aged 29, died July 6 of angina pectoris.

Dr. John James, Danville, died August 21.

Dr. Jerry Sterling Cooper, Roanoke, aged 43, died September 9 at a sanatorium in Burkeville of pulmonary tuberculosis.

Dr. Ernest Reginald Grasty, Danville, aged 39, died February 29 in a hospital at Petersburg.

WEST VIRGINIA

Members of the Raleigh County Medical Society cooperated with the Rotary and Kiwanis Clubs of Beckley September 7 in the holding of an orthopedic clinic for crippled children which was conducted by Dr. Robert T. Taylor, Professor of Orthopedic Surgery, University of Maryland School of Medicine, Baltimore, Maryland.

About 100 civic leaders, co-workers and friends of Dr. William W. Golden, Elkins, gathered at a dinner October 3 to celebrate his completion of twenty-five years' service as Superintendent of the Davis Memorial Hospital.

Deaths

Dr. Harry E. Hutson, Smithburg, aged 59, died August 22 of cerebral hemorrhage.

Laboratories of

Drs. Bunce, Landham and Klugh

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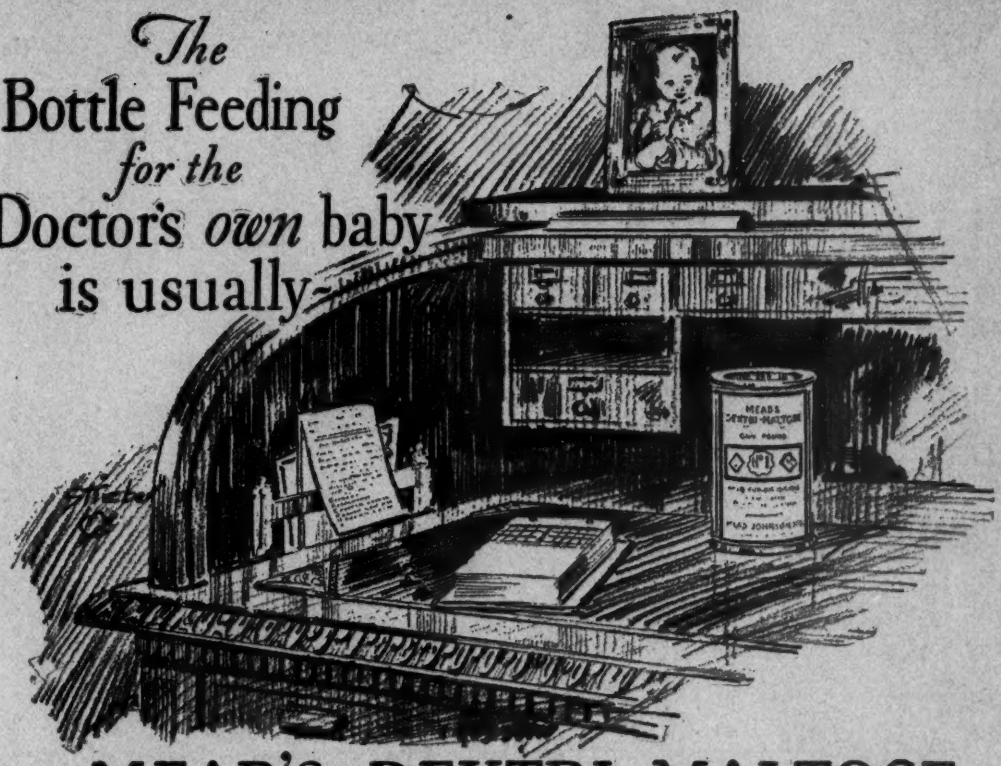

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